

# **Assessment of Savannah River Site's Software Quality Assurance Processes for Design & Analysis Software for Safety Systems**

**(SQAIP 4.2.4.3)**

**On-site Assessment 2/18/04 – 2/19/04**

3/18/2004

FSS-TQS-2004-00002

## Signature Page

Gregg Nelson	<u>Gregg Nelson (KM)</u>	<u>3-25-04</u>
	Signature	Date
Keith Morrell	<u>Keith Morrell</u>	<u>3-18-04</u>
	Signature	Date
Vince Grosso	<u>Vince J. Grosso</u>	<u>3-18-04</u>
	Signature	Date
Elaine Doolittle	<u>Elaine Doolittle</u>	<u>3-22-04</u>
	Signature	Date
Dennis Adams	<u>Dennis Adams (KM)</u>	<u>3-18-04</u>
	Signature	Date
(Dan, Chip, and Bill were unable to attend on Feb 19. They have reviewed and concur with this report)		
Dan Zweifel	<u>Dan Zweifel</u>	<u>3-18-04</u>
	Signature	Date
Bill Rowland	<u>Bill Rowland</u>	<u>3/23/04</u>
	Signature	Date
Chip Lagdon	<u>Chip Lagdon (KM)</u>	<u>3-18-04</u>
	Signature	Date

(In the event all team member signatures cannot be obtained due to logistical considerations, the assessment team leader should obtain members' concurrence and sign for them.)

## Signature Page

# Table of Contents

1.0	Introduction.....	4
1.1	Reason for Assessment .....	4
1.2	Background .....	4
1.3	Savannah River Site .....	4
1.4	Summary of approach: .....	5
2.0	Summary of Assessment .....	5
2.1	Highlights:.....	6
3.0	Lessons Learned.....	7
3.1	Positive Lessons / SRS SQA.....	7
3.2	Error Notification Lesson Learned: .....	7
4.0	Detailed Results .....	8
4.1	Software Quality Assurance Program.....	8
	Criteria Met: YES .....	8
4.2	Software Requirement Description.....	8
	Criteria Met: YES .....	8
4.3	Software Design Description.....	8
	Criteria Met: YES .....	8
4.4	Software Testing, Acceptance and Turnover (SRS terminology) .....	8
	Criteria Met: YES .....	8
4.5	Software User Documentation.....	8
	Criteria Met: YES .....	8
4.6	Software Configuration Management .....	8
	Criteria Met: YES .....	8
4.7	Software Procurement.....	8
	Criteria Met: YES .....	8
4.8	Problem Reporting & Corrective Action.....	8
	Criteria Met: YES .....	8
5.0	Attachments .....	8
5.1	Background information on Assessment Team .....	8
5.2	Lines of Inquiry Summary.....	8
5.3	Assessment of Documents Reviewed List.....	8
5.4	WSRC SQA Procedures List .....	8
5.5	Glossary (U) Revision No. 35 January 30, 2004 .....	8

# 1.0 Introduction

---

## 1.1 Reason for Assessment

---

This assessment is a deliverable for a commitment of the U. S. Department of Energy Implementation Plan for Defense Nuclear Facilities Safety Board Recommendation 2002-1 Quality Assurance for Safety Software at Department of Energy Defense Nuclear Facilities.

**Commitment 4.2.4:** Assess the processes in place to ensure that safety software currently used to support the analysis and design of defense nuclear facilities is adequate and implement corrective actions as necessary.

## 1.2 Background

---

The Defense Nuclear Facilities Safety Board (Board) issued Recommendation 2002-1, Quality Assurance for Safety-Related Software, on September 23, 2002. In that Recommendation, the Board noted its concerns regarding the quality of the software used to analyze and guide safety related decisions, the quality of the software used to design or develop safety-related controls, and the proficiency of personnel using the software. In addition, the Board noted that software performing safety-related functions in distributed control systems, supervisory control and data acquisition systems, and programmable logic controllers (PLCs) requires appropriate quality assurance controls to provide adequate protection for the public, the workers, and the environment.

## 1.3 Savannah River Site

---

The Savannah River Site (SRS) is a Department of Energy (DOE) facility that provides products and services essential to achieving the DOE's goals including:

- Nuclear Weapons Stockpile Stewardship
- Nuclear Materials Stewardship
- Environmental Stewardship

SRS occupies approximately 310 square miles, (about the size of the area inside the Washington, D.C. beltway) and is located 12 miles south of Aiken, South Carolina on the Savannah River which forms the boundary between South Carolina and Georgia. Augusta, Georgia is about 25 miles northwest of the site. Established in 1950 by the Atomic Energy Commission, SRS has been involved in the production of tritium and plutonium in support of the Nation's nuclear stockpile.

SRS supports missions for both DOE National Nuclear Security Administration (NNSA) and DOE-Environmental Management (DOE-EM) organizations. The SRS Software Quality Assurance (SQA) program has one set of processes and procedures that apply for both NNSA and DOE-EM. The Design & Analysis Software at SRS is used for both NNSA and DOE-EM work. This assessment action was a combined effort of the NNSA Savannah River Site Office (NNSA-SRSO), DOE-EM, DOE-HQ, and Westinghouse Savannah River Company (WSRC).

---

## 1.4 Summary of approach:

---

The assessment team established a schedule to complete the assessment of the processes in place to ensure that safety software currently used to support the analysis and design of defense nuclear facilities is adequate. To complete the assessments of the processes in place to ensure that safety software currently used to support the analysis and design of defense nuclear facilities is adequate, the following steps were completed.

- Identify Assessment team members
- Develop Lines of Inquiry (LOI) for Assessment
- Identify Software for Assessments
- Conduct assessments per schedule
  - Contact owner of system to be assessed
  - Meet and collect documentation
  - Analyze documentation per LOI
  - Interview owner, users, and support personnel for system
  - Generate and Review Assessment reports
  - Take actions as required

This assessment reviewed the SRS Software Quality Assurance (SQA) processes and how they are implemented for Design & Analysis (D&A) Software for Safety Systems. The team reviewed two specific codes GTSTRUDL, a structural code, and Tank Top Loading code. GTSTRUDL is a purchased code package and Tank Top Loading is an SRS developed code.

The LOI (attachment 5.2) was developed focusing on the following major topical areas:

- QA / SQA Program & Processes
- Total Lifecycle of Software
- Requirements
- Design and Development
- Testing, Acceptance, and Turnover (others define as part of V & V)
- Operations and Maintenance
- Documentation
- Other related areas (procurement, security, past assessments, etc)

---

## 2.0 Summary of Assessment

---

An overview presentation of the SRS Quality Assurance (QA) program and the SRS Software Quality Assurance (SQA) program was given on February 18 to provide all team members an understanding of the SRS SQA foundation. On February 19 additional details of the SRS SQA process for handling Design and Analysis software was presented. This made it clear that SRS has one SQA program that addresses all software, including Design and Analysis Safety System Software.

The assessment team was satisfied that the SRS SQA Program met the assessment criteria. Only one item (Error Notification) required additional research. The concern

was that four users of the code did not respond as required to an error notification. The SRS response to this item is included in this report, in Section 3.0 Lessons Learned. The SRS SQA program and documents reviewed clearly show that the SRS SQA program includes Design and Analysis Software used for Safety Systems. The program as executed will maintain reliability of the software over its life cycle.

Assessment highlights are provided below, details are provided in Section 4.0 Detail Results, and via the following Attachments: 5.2 Lines of Inquiry (LOI) summary, 5.3 Assessments Documents Reviewed List and 5.4 WSRC SQA Procedures List.

Based on these results and past assessments no additional assessments will be conducted at SRS for Design & Analysis for the SQAIP 4.2.4 action in response to DNFSB 2002-1. It is recommended that SRS continues its current SQA program, making improvements and conducting periodic assessments as needed. Process based metrics have been and will be applied where applicable.

---

## **2.1 Highlights:**

---

### ***SRS SQA Program***

(Was developed / based on the following)

- Based on Industry Standards, Federal Regulations, DOE Orders and best practices
- Integrated in QA program and Safety Management (QA / ISMS)
- Tracks contractual commitments related to QA / SQA via S/RID system
- Covers all software, including Design & Analysis Software
- Software Classification process / Safety criteria applied
- Graded approach
- Covers entire lifecycle from conception through retirement
- Connected to Procurement process
- Applies to developed , procured , and acquired software
- A Software Quality Assurance Plan (SQAP) is required for Safety Software
- Recent assessments and reviews have been very positive

### ***Design and Analysis / GTSTRUDL & Tank Top Software***

- Software Quality Assurance Plans
- Requirements Documents
- Review and Approval of documents
- Change Control / Configuration Management
- Problem Reporting and Correction action
- Defined Engineering calculation procedure
- Requirements are clearly traceable through testing
- Vendor QA manual for GTSTRUDL with details
- Tank Top manual with design details
- Test cases used to validate GTSTRUDL
- Proven Engineering techniques used to validate Tank Top
- Tests cases are applied and reviewed after code change, before use

- Codes are controlled and limited to approved engineers
- A Lead engineer is responsible for each code
- Training is coordinated
- Independent review process

## **3.0 Lessons Learned.**

---

### **3.1 Positive Lessons / SRS SQA**

---

The following is a list of the positive aspects of the SRS SQA program assessed.

- SQA program is an integrated part of QA program, not a separate program
- One QA / SQA program for Site
- All software including Safety Software covered
- Software classification process implemented
- Graded approach implemented
- Based on proven standards and government rules / orders / guidance
- Covers entire lifecycle (conception through retirement)
- Covers developed procured or acquired software.
- Involvement with standards and industry organizations provides benefits
- Configuration Management / Change Control
- Testing process
- Independent Review
- Training provided
- Lead Engineer for each Design & Analysis Code
- Problem Reporting and Correction process
- Defined roles and responsibilities
- Review and approval required
- Documentation requirements
- Procurement and Security requirements are connected
- Error notification process (see below)

---

### **3.2 Error Notification Lesson Learned:**

---

Error reports received by the site are first reviewed by the lead engineer for applicability to the site, test cases are again run and notification is made to each of the site users as appropriate. Receipt of an error notification is required. It was noted that 4 users of GTSTRUDL had not confirmed receipt of an error notification.

WSRC Action to improve: Design Services Error Notification Process

Process: Suppliers distribute error notices to the Software Administrator.

The Software Administrator enters the error notice information into the Error Notice database and routes the notice to the Software Technical Engineer (STE) for review. The assigned STE is the subject matter expert (technical function) assigned to monitor the use of the program.

The STE determines the applicability of the error to our use of the program at Savannah River Site. If the versions or modules affected by the error are used, then the STE completes the Software Error Notification (Site OSR Form 19-324). The form serves as a transmittal of the error to the user and includes the STE's error evaluation, impact description, and recommendations for error avoidance and/or remedial actions. The STE signs the completed form and submits that to the Software Administrator for distribution to the users.

The error notice is scanned as a ".pdf" file, and then transmitted to the users via email, with delivery reports and read receipts mail options. The email provides instruction to the users to sign Block 19 of the form to acknowledge receipt and to acknowledge that they will take appropriate preventive and/or remedial action in accordance with the STE's instructions. The user signs and returns a copy of the signed form to the Software Administrator.

The error reviewed by the assessment team on 2/19/04 lacked signed copies from four (4) GTStrudl users. All of these individuals have signed and returned the copies, with the exception of one individual, who has transferred to another division on a rotational assignment. In this case, the STE has reviewed the user's one (1) GTStrudl calculation against the error and has signed the form for him. The STE will continue to perform these reviews until the user returns to Design Services.

In an effort to facilitate improved user responses to error notifications now and in the future, our Design Services Discipline Chiefs will be informed on the progress of error notice response. Any user failing to sign the form will be reported to their Discipline Chief in writing. The users will be given one (1) reminder after a required response time of five (5) days. Any user who fails to respond to the reminder notice will be reported to the Discipline Chief with the user on copy. Users leaving the site are being reported to the STE via email. The Design Services organization has updated their desktop processes to implement this improvement.

## 4.0 Detailed Results

---

### 4.1 Software Quality Assurance Program

---

Criteria Met: YES

#### *Software Quality Assurance Policies, Process, Procedures and Standards*

##### *Objective:*

Software quality activities evaluated for applicability to the Design & Analysis Software for Safety Systems, to the appropriate level of rigor, and implementation.



**Results:**

Software quality activities are evaluated for applicability to the software and are defined to the appropriate level of rigor, and are implemented. Software quality activities and software practices for requirements management, software design, configuration management, verification, testing and documentation are evaluated and established at the appropriate levels for Design & Analysis software codes. Effective implementation was demonstrated by the reviews of the various documents listed in attachment 5.3 & 5.4, discussions with the responsible engineers and review of the configuration change control process.

A well defined process is in place for SQA (Quality Assurance Procedure / Software Quality Assurance 20-1 and E7 Engineering Manual) which includes Design & Analysis Safety System Software. The program is based on regulatory guides and standards. SRS has a defined classification process for all software that is documented and executed. The site uses a graded approach and covers both purchased and developed hardware and software. Both are well defined and executed. The SQA program covers the entire lifecycle from concept through retirement for Design & Analysis software. The SQA process is connected to the procurement and security processes.

## **Software Quality Assurance Data**

---

### **4.2 Software Requirement Description**

---

**Criteria Met: YES**

**Objective:**

D&A software functions, requirements and their bases are defined and documented.

**Results:**

GTSTRUDL and Tank Top Program software systems were reviewed for appropriate SQA processes including functions, requirements, and their bases are defined and documented. Both codes have proper functional and performance requirements that are complete, correct, consistent, clear, testable, and feasible. The GTSTRUDL Quality Assurance Manual and Tank Top Program SQAP were reviewed.

Both Software Quality Assurance Plans are defined and being executed. They cover the entire lifecycle. The plan defines the requirements through the Quality Assurance Program Documents and Engineering Manuals that specify detailed requirements consistent with classification of the software. These processes were followed for the two systems reviewed.

These codes are developed and used in a quality manner. They are general purpose codes used for many different facilities. During the assessment the team did not examine the specific use of the output of these codes to determine if they met the design basis of specific facility requirements.

The GTSTRUDL code has specific requirements to do structural analysis. Over 260 test cases are used to verify operation. The Tank Top code has gone through modifications due to different tank requirements. In each case new test cases were developed. These test cases are based on known engineering solutions to problems.

---

### **4.3 Software Design Description**

---

**Criteria Met: YES**

***Objective:***

The software design description (SDD) depicting the logical structure, information flow, logical processing steps, and data structures, are defined and documented.

***Results:***

Documents for the Design are reviewed and approved per the procurement process for GTSTRUDL. Documents for the Tank Top program requirements were also reviewed. GTSTRUDL is a vendor procured product that has a vendor QA manual. The Tank Top software has a manual with details and tests in the control file documents. Both manuals provide the design description for the codes.

---

### **4.4 Software Testing, Acceptance and Turnover (SRS terminology)**

---

**Criteria Met: YES**

(Verification and Validation to others)

***Objective:***

The Testing, Acceptance and Turnover (placed in production operation) process and related documentation for D&A software are defined and maintained to ensure that (a) the software adequately and correctly performs all its intended functions; and that (b) the software does not perform any adverse unintended function.

***Results:***

The GTSTRUDL software is tested when new versions are released or when there is an error correction from the vendor. This is done prior to the site use. The site tests must agree with the vendor tests prior to use. Error reports issued by the vendor are received by the site and reviewed by the lead engineer (STE) to determine impact. Test cases are run again to validate the software performance and notification is made to each site user. Acknowledgement of the error notification is required by the user.

For the Tank Top software a process is followed and test cases are checked prior to use. The test results for both follow the SRS defined procedures. Test cases are run to make sure the code is performing the analysis correctly.

SRS utilizes independent review as the term for verification performed by a separate person. This process requires that the results of the independent review must be documented and the individual identified. The Design Authority ultimately verifies that all required independent reviews of software test cases were performed and approves all software test documentation.

All documents (attachment 5.3) were approved and are under configuration control / document control. Error notifications and error responses are also tracked.

---

## **4.5 Software User Documentation**

---

**Criteria Met: YES**

***Objective:***

Software documentation is available to guide the user in installing, operating, managing, and maintaining the software.

***Results:***

Documentation for installing, operating, managing, maintaining and training were reviewed (attachment 5.3). Access to software and documentation is limited to approved users. Training is provided and coordinated by the lead engineer for the D&A software. Documentation is controlled within the configuration management process to ensure the correct version is used.

---

## **4.6 Software Configuration Management**

---

**Criteria Met: YES**

***Objective:***

Software components and products are identified and managed, and changes to those items are controlled.

***Results:***

The GTSRTUDL and Tank Top software codes and related documents are identified, managed, and changes to those items are controlled in accordance with the SRS procedures. Components to be managed are identified by procedures and a system is established to manage the testing, installation, modifications, versions, and related documents. Procedures for modifications to those software products are followed.

Software modifications are strictly controlled in accordance with SRS procedures. A structured approach is used and well documented for both GTSTRUDL and Tank Top codes. Software testing results were attached to the required documents and verified by independent review.

---

## **4.7 Software Procurement**

---

**Criteria Met: YES**

***Objective:***

Acquired software meets the applicable level of quality to ensure the safe operation of the system.

***Results:***

GTSTRUDL is a purchased D&A Software package and follows the SRS procedures for acquired software. The SRS procedures were implemented for this code and the documentation reviewed supports the SQA requirements. The SRS SQA program is connected to the SRS Procurement process, based on the software classification. The required procurement actions are implemented based on the classification level. The SRS QA / Procurement program requires vendors to meet the requirements for this classification software. GTSTRUDL met those requirements.

---

**4.8 Problem Reporting & Corrective Action**

---

**Criteria Met: YES**

***Objective:***

A process for D & A Software problem reporting is established, maintained, and controlled, including notification of errors, failures, and corrective action development.

***Results:***

For GTSTRUDL and all other purchased codes the error reports received by the site are first reviewed by the lead engineer for applicability to the site, test cases are again run and notification is made to each of the site users as appropriate. Receipt of an error notification is required. For the Tank Top code, a verification process is followed and test cases are checked prior to use.

**(Reference Lessons Learned Section for more detail)**

---

**5.0 Attachments**

---

- 5.1 Background information on Assessment Team
- 5.2 Lines of Inquiry Summary
- 5.3 Assessments Documents Reviewed List
- 5.4 WSRC SQA Procedures List
- 5.5 Glossary of Terms

---

## 5.1 Background information on Assessment Team

---

**Dennis Adams:** A retired Department Manager from Idaho National Engineering and Environmental Engineering Laboratory. Developed Man Rated Flight Hardware for NASA. As program manager I had responsibility for the Commercial Nuclear Power Emergency Response System. Designed and developed the software that controlled the three 55 ton refueling mechanisms in the Fast Flux Test Facility. I was Program Manager for \$100 M military command and control system that produced "go to war" hardware within budget and on schedule. Deputy Assessor for the two recent NNSA software assessments for the Accelerated Scientific Computing Initiative

**Elaine Doolittle:** WSRC - 11 years, Configuration Management and Engineering Automation, Procedures, Policies, and Assessments. Vice-Chair of the Site Conduct of Engineering Committee, Maintain the Conduct of Engineering Manual and Six Sigma Yellow Belt. Battelle - 4 years, System Functional Testing, Asset Lifecycle Management.  
**Education:** BS in Computer Science from Clemson University

**Vince GROSSO:** Current responsibility is for the WSRC Quality Assurance Program. Work with internal and external organizations to assure Quality Assurance Rule, DOE requirements, WSRC policy, and national codes and standards are managed, interpreted, documented, understood, and implemented. Responsible Quality Assurance Functional Area Subject Matter Expert supporting the Quality Assurance Functional Program Manager. Responsibilities also include managing the WSRC Quality Assurance Policy, Quality Assurance Management Plan, Corporate Quality Assurance Procedures, and secretary for the WSRC Quality Managers Committee. Participated in DOE HQ Quality Assurance evaluations at other DOE complex sites, and have also performed WSRC audits, assessments, and surveillances. Commercial nuclear experience includes construction, start-up, operations, outages, and D&D / recovery operations at TMI. Past 20+ years: Government Nuclear – WSRC / Commercial Nuclear  
**Education:** Master of Science Human Resource Management / Masters of Business Administration / Bachelors and Associates in Science and Math  
**Active Memberships:** National Management Association

**Chip Lagdon:** Chip Lagdon is the Director for the Office of Quality Assurance Programs in the Office of Environment Safety and Health. In this capacity, he is responsible for Quality Assurance Programs within the Department. Presently, Mr. Lagdon is the lead for Defense Nuclear Facilities Safety Board Recommendation 2002-1 on Software Quality Assurance and is managing the completion of over 29 commitments by line organizations and the field. He also has program responsibility for the Radiation & Environmental Services Laboratory in Idaho, the Voluntary Protection Program, the Quality Assurance Order, the Analytical Services Program and the DOE Laboratory Accreditation Program.

**Keith Morrell:** Westinghouse Savannah River Company Technical Advisor. I have responsibility for the Software Quality Assurance program at the company level. Work with internal and external organizations to assure Software Quality Assurance requirements, policy and standards are implemented, maintained and improved from conception through retirement. I have worked in Government Nuclear, Commercial Nuclear, and Oil & Gas Industry with 25+ years in the technology business area.  
**Education:** BS in Business Administration from Greensboro College  
**Active Memberships:** American Society of Mechanical Engineers – NQA, Nuclear Information Technology Strategic Leadership, Software Computing Consortium (CMU)

**Gregg Nelson:** Began career with the National Nuclear Security Administration in September 2001. Currently, he is the Savannah River Site Office Point of Contact for Information Technology, Cyber Security and Software Quality Assurance.  
**Education:** BS in Electrical Engineering from the University of South Carolina.  
**Active Memberships:** National Society of Black Engineers

## 5.2 Lines of Inquiry Summary

SRS/ WSRC - QAIP / IP 4.2.4 Assessment of Safety System Software for Design and Analysis System: GTStrudl / Tank Top Design & Analysis Safety System Software Classification: B					
Q#	Review Questions	Yes/No	Validate by Standards/Requirements and Process/Procedures	Verify by Objective Evidence	Institutionalized Yes/No
	This column lists the review questions tailored for SRS business. CRAD document 4.2.4.1 will be used as a guide for the review and report generation.	Yes positive and objective evidence exists; No, otherwise.	Identify the applicable standards, requirements, and associated process/procedures applied that result in effective implementation and production of the objective evidence.	This column identifies the objective evidence where it exists (e.g., records, reports, work packages, e-mails, meeting minutes, and other documents). GTStrudl or other Design & Analysis Specific Documents as required. All of our Design & Analysis Safety System Software follow the same WSRC procedures and Processes.	This column indicates if the site processes / procedures were applied.
0	Questions #0 look at the procedures and process in place at SRS and reference the standards they are based on. Are the site level QA/SQA procedures applicable for Safety System Software?	YES	10CFR830 Subpart A Quality Assurance, DOE Order 414.1A Quality Assurance, ASME NQA-1-1997, ASME NQA-1a-1999, ASME NQA-1-2000 QUALITY ASSURANCE REQUIREMENTS FOR NUCLEAR FACILITY APPLICATIONS, DOE/AL QC-1, Rev. 9 DOE/AL Quality Criteria (QC-1), DOE/RW-0333P, Rev 6 Quality Assurance Requirements and Description for the Civilian Radioactive Waste Management Program, ANSI/ASQC E4 SPECIFICATIONS AND GUIDELINES FOR QUALITY SYSTEMS FOR ENVIRONMENTAL DATA COLLECTION AND ENVIRONMENT TECHNOLOGY PROGRAMS, Additional IEEE Standards are applied via ASME NQA and referenced in procedures	WSRC IQ Quality Assurance Manual procedure: 20-1 Software Quality Assurance / WSRC E7 - Conduct of Engineering Manual procedures: 2.25 Functional Classifications, 2.31 Engineering Calculations, 2.40 Design Verification and Checking, 5.01 Software Engineering and Control, 5.03 Software Quality Assurance Plan, 5.04 Software Project Management Plan, 5.05 Software Classification, 5.07 Evaluation of Existing and Acquired Software, 5.10 Software Requirements, 5.20 Software Design and Implementation, 5.40 Software Testing, Acceptance, and Turnover, 5.61 Engineering & Scientific Software Distribution and Control, 5.62 Computer Program Modification Tracker, 5.80 Data Management. Additional WSRC QA, SQA, Security, Records Management and Procurement procedures apply and are used as required. WSRC Quality Assurance management Plan (QAMP)	YES. The software processes and procedures are applicable to safety system software. They follow accepted national regulatory guides and standards. SRS is also represented on several software/safety committees of national stature.

0a	Do the same procedures documented in QAIP 3.3 action apply ?	YES	See attached QAIP 3.3 report	as required	YES. The software processes and procedures are applicable to safety system software. They follow accepted national regulatory guides and standards. SRS is also represented on several software/safety committees of national stature.
0b	Does the site have a defined classification process for safety software ?	YES	WSRC 1Q Quality Assurance Manual procedure: 20-1 Software Quality Assurance / WSRC E7 - Conduct of Engineering Manual procedures: 2.25 Functional Classifications, 5.05 Software Classification	FOLLOW THE SITE QA PROGRAM.	YES. The site has a defined software classification process that includes safety software.
0c	Does the site have a graded approach to software, that includes safety software ?	YES	WSRC 1Q Quality Assurance Manual procedure: 20-1 Software Quality Assurance / WSRC E7 - Conduct of Engineering Manual procedures: 2.25 Functional Classifications, 5.01 Software Engineering and Control, 5.03 Software Classification	Yes, Level 1 and Level 2 for Safety Class. GTStrudl is purchased under a Level 1 procurement.	YES. The site uses a graded approach to a defined software processes. During the review we looked two design and analysis systems. There was a clear distinction in process followed. In the one case the D&A software was a procured product that followed a much different, but process than the indications and warning systems. In both cases the process were well defined and being followed by the engineers and development personnel.



0d	Do the QA/SQA procedures cover the entire lifecycle of the safety system software from concept through retirement ?	YES	WSRC 1Q Quality Assurance Manual procedure: 20-1 Software Quality Assurance / WSRC E7 - Conduct of Engineering Manual procedures: 2.25 Functional Classifications, 2.31 Engineering Calculations, 5.01 Software Engineering and Control, 5.03 Software Quality Assurance Plan, 5.04 Software Project Management Plan, 5.05 Software Classification, 5.07 Evaluation of Existing and Acquired Software, 5.10 Software Requirements, 5.20 Software Design and Implementation, 5.40 Software Testing, Acceptance, and Turnover, 5.61 Engineering & Scientific Software Distribution and Control, 5.62 Computer Program Modification Tracker, 5.80 Data Management. WSRC 1Q Quality Assurance Manual procedures: 20-1 Software Quality Assurance, Procedure 2-3, "Control of Research and Development Activities", Procedure 2-7, "QA Program Requirements for Analytical measurement Systems", Procedure 7-3, "Commercial Grade Item Dedication", Procedure 12-1, "Control of Measuring and Test Equipment", Procedure 15-1, Control of Nonconforming Items" / WSRC Procurement Procedures: Manual 7B, Procurement Management Manual, Manual 3E, Procurement Specification Procedure Manual	FOLLOW THE SITE PROCEDURES	YES. the system lifecycle is covered through retirement. The SQAP plans address the entire lifecycle.
0e	Do the QA/SQA procedures cover the Procurement process for Safety System Software?	YES	WSRC 1Q Quality Assurance Manual procedures: 20-1 Software Quality Assurance, Procedure 2-3, "Control of Research and Development Activities", Procedure 2-7, "QA Program Requirements for Analytical measurement Systems", Procedure 7-3, "Commercial Grade Item Dedication", Procedure 12-1, "Control of Measuring and Test Equipment", Procedure 15-1, Control of Nonconforming Items" / WSRC Procurement Procedures: Manual 7B, Procurement Management Manual, Manual 3E, Procurement Specification Procedure Manual	FOLLOW THE SITE PROCEDURES	YES. The GTStrudl code is a procured code with a large user community. The procurement org does a tri-annual review of their processes and the vendor is responsible for SQA. The SQA procedures and procurement procedures are connected and apply classification level to ensure the correct level of rigor for the procurement.
1	REQUIREMENTS	YES	WSRC 1Q Quality Assurance Manual procedure: 20-1 Software Quality Assurance / WSRC E7 - Conduct of Engineering Manual procedures: 5.03 Software Quality Assurance Plan, 5.10 Software Requirements,	Specific system documents	YES

1a	Is Design & Analysis software covered by a Software Quality Assurance Plan (SQAP), and is the SQAP a lifecycle document ?	YES	See Requirements	C-SQP-G-00069 (Software Quality Assurance Plan) Latest version - Rev. 2, applicable to Versions 26 and 27 of GTStrudl C-VVR-G-00049 (Verification and Validation Report), Latest version - Rev. 3	YES, Both the GTStrudl and the Tank Top Vertical Load Analysis Programs are covered by a Software Quality Assurance Program that includes lifecycle components. In the first case the vendor is responsible for the plan and in the second place the site is the responsible party.
1b	Is there a Requirements Document that identifies expected Design & Analysis Functionality	YES	See Requirements	C-SQP-G-00069, Rev. 2 VVR-G-00049, Rev. 3 G-00023 REV 0	YES. Document for each provided.
1c	Is the Design & Analysis Requirements Document appropriately reviewed, approved, issued, and under change control?	YES	See Requirements	GTStrudl QA Manual and WSRC Audit of the vendor's quality assurance program. - Level 1 suppliers are audited every three years by site procurement quality assurance department. The last GTStrudl audit (No. 2002-VAR-18-013) was conducted in 2002. The next audit will be due in August, 2005. Level 1 suppliers are subject to SRS Procurement Supplier Supplemental Audits at any time during the three year period between supplier audits. Suppliers must pass these audits and be placed on the Qualified Suppliers List (QSL) prior to purchase. GTStrudl's Software Quality Assurance Plan (SQAP) is revised during verification of a new version if the Software Technical Engineer (STE) determines that it is necessary.	YES. There is evidence that both codes are reviewed and approved with signatures in appropriate documents. These documents were under change control.
1d	Are the Design & Analysis requirements consistent with the Safety Basis ?	YES	See Requirements	See 1c.	YES. these code are developed and used in a quality manner consistent with safety. We did not look at specific applications of the code for a facility.

1e	Are Design & Analysis requirements clearly identified, traceable and testable?	YES	See Requirements	C-VVR-G-00049, Rev. 3	YES. GTStrudl code has specific requirements to do certain structural analysis's. The code relies on some 260+ test cases to verify operation. The Tank top code has gone through several modifications due to different configurations of tanks that needed to be analyzed and for each mod new test cases were developed for testing. These test cases are based on known engineering solutions to the problems
1f	Is the Design & Analysis Requirements Document a Lifecycle document to be maintained until system retirement ?	YES	See Requirements	C-SQP-G-00069, Rev. 2.	YES
2	DESIGN and DEVELOPMENT	YES	WSRC 1Q Quality Assurance Manual procedure: 20-1 Software Quality Assurance / WSRC E7 - Conduct of Engineering Manual procedures: 5.03 Software Quality Assurance Plan, 5.04 Software Project Management Plan, 5.05 Software Classification, , 5.10 Software Requirements, 5.20 Software Design and Implementation, 5.40 Software Testing, Acceptance, and Turnover,	Specific system documents	YES

2a	Is Design & Analysis software design documented in a Design Description - Software (DDS) ?	YES	See Design and Development	GTStrudl Vendor QA Manual WSRC Audit Statement of Work PR 9B3833, Rev. 5	YES. GTStrudl is a vendor procured product so detailed Design Descriptions were not available. There is a vendor QA manual with some information, but not a DDS in the nominal sense. The procurement specifications for GTStrudl describe required functions. For the Tank Top program there was a manual with details and tests in the document control file.
2b	Is the DDS reviewed, approved and consistent with governing procedures?	YES	See Design and Development	GTStrudl Vendor QA Manual WSRC Audit Statement of Work PR 9B3833, Rev. 6	YES. Documents for the DDS are reviewed and approved per procurement process requirement for GTStrudl and Tank Top. All documents that I checked were signed and approved.
3	SOFTWARE TESTING, ACCEPTANCE AND TURNOVER	YES	WSRC 1Q Quality Assurance Manual procedure: 20-1 Software Quality Assurance / WSRC E7 - Conduct of Engineering Manual procedures: 5.03 Software Quality Assurance Plan, 5.40 Software Testing, Acceptance, and Turnover,	Specific system documents	YES. The GTStrudl system is tested when new versions are released or when there is an error correction from the vendor. This done prior to site use. The site tests must agree with the vendor tests prior to use. Error reports received by the site are first reviewed by the lead engineer for applicability to the site, test cases are again run and notification is made to each of the site users as appropriate. Receipt of an error notification is required. For the Tank Top code, a verification process is followed and test cases are checked prior to use.

3a	Testing done under a Test Plan that has been independently reviewed, approved and issued?	YES	See Software Testing, Acceptance and Turnover	C-VVR-G-00049, Revision 3/GTStrudl QA Manual and WSRC Audit	YES. The tests follow site procedures and in some case a separate test plan is not used but procedures in the SQA manual are followed involving the execution of test cases.
3b	Testing prove that the requirements have been met and implemented correctly ?	YES	See Software Testing, Acceptance and Turnover	C-VVR-G-00049, Revision 3	YES. In each case test cases are run to verify that the code is performing the required analysis correctly.
3c	Does the Test Plan require an independent review and approval of the test results?	YES	See Software Testing, Acceptance and Turnover	C-VVR-G-00049, Rev. 3 (A checker is required to check verification testing results. G-ISV-G-00050, Rev. 6 (Initial Software Verification) approvals included: Software Technical Engineer, Software Engineer Verifier, Functional and Configuration Manager).	YES. In each case the test cases are reviewed by an independent reviewer.
4	OPERATIONS AND MAINTENANCE	YES	WSRC 1Q Quality Assurance Manual procedure: 20-1 Software Quality Assurance / WSRC E7 - Conduct of Engineering Manual procedures: 5.01 Software Engineering and Control, 5.03 Software Quality Assurance Plan, 5.40 Software Testing, Acceptance, and Turnover, 5.61 Engineering & Scientific Software Distribution and Control, 5.62 Computer Program Modification Tracker, 5.80 Data Management.	Specific system documents	YES
4a	User documentation available at system acceptance?	Yes, if applicable. See objective evidence.	See Operations and Maintenance	Question is applicable if the word "system" is replaced by "software". User documentation/manuals are available on line.	YES. User documentaion is available to approved users and training is coordinated by the lead engineering for that code.

				Analysis results are documented in calculation packages and maintained in Document Control. For example: Calculation No. T-CLC-F-00296. Design hardware modification is addressed. For example: ISV's for GTStrudl Version 27 are C-ISV-G-00050, Rev. 5 on Windows 2000 Service Pack 3 and C-ISV-G-00050, Rev. 6 for Windows 2000 Service Pack 4. Software error notification is addressed. For example: Software Error Notification No. EA1C-C212V-SEN-2003-01. GTStrudl QA program and WSRC Auditing. GTStrudl is off the shelf software which is distributed by the Software Library. Each revision to software or operating systems requires new ISV (verification).	
4b	Design & Analysis configuration items be identified to enable configuration management?	Yes in reference to calculations.	See Operations and Maintenance		YES. Very good documentation control, configuration control, change management process established.
4c	Design & Analysis software be placed under configuration management?	YES	See Operations and Maintenance		YES. All documents were approved and under document control. Error notifications and error responses to the notifications were tracked. YES. Modifications to the tank top code were done in accordance with E7 The Conduct of Engineering Manual procedures. GTStrudl code changes are coordinated through the vendor to meet E7 and Procurement requirements.
4d	Design & Analysis software be modified according to E7 and / or approved SQAP?	YES	See Operations and Maintenance	Specific system documents	
4e	A process to handle software problem reporting and corrective action ?	YES	See Operations and Maintenance	Software Error Notification is managed per QAP 20-1 and E7, 5.61. Errors are reviewed by the STE and transmitted to users via the SEN document (For example: EA1C-C212V-SEN-2003-01) with signed receipt.	YES. In both cases a process was in place and being used to handle problem reporting and corrective action.
5	QA/SQA Document process ?	YES	WSRC 1Q Quality Assurance Manual procedure: 17-1 "Quality Assurance Records Management"	QAP 20-1 and E7 procedures reference / follow the site records management procedures	YES. A document management process is in place and being followed by engineering staff. It was notable that the engineering personnel were aware of and followed their processes.
6	List any recent (past two years) related assessments & results	X	QA Audit No. 2002-VAR-18-013 of GTStrudl QA Program.	Audit closure per MSD-PQE-2003-0147, dated 4/28/03.	X

DNFSB Review of SQA 1/15/03	Positive results	YES. DNFSB staff members reviewed the WSRC SQA processes and recommended that the Requirements Tracibility Matrix begin in the requirements phase. This was added as an option to the WSRC procedure. YES. self-assessment documents were QA documents and processes were compared to commercial nuclear facilities. A really good practice. Results were documented as favorable.
P&CT self Assessment program for has reviewed SQA	2001, 2002,2003	

### 5.3 Assessment of Documents Reviewed List

Rev	Date	Number	<u><b>GT STRUDL</b></u>	Name
2.5	3/1/2003	Second edition	GT STRUDL	Quality Assurance Manual
	8/22/2001	Supplier Code 156	GT STRUDL	Qualified Supplier List (QSL) verification form
	9/29/2003	2002-VAR-18-013	GT STRUDL	Audit Closure for Audit for QSL
5	2/5/2001	SOW PR 9B3833	GT STRUDL	Statement of Work
2	1/1/2003	C-SQP-G-00069	GT STRUDL	SQAP for GTSTRUDL
27	10/24/2003	C-VVR-G-00049	GT STRUDL	Validation of GTSTRUDL V27 Finite Element Computer Code
6	1/12/2004	G-ISV-G-00050	GT STRUDL	Initial software Verification Form (161 test cases)
	RANGE	All	GT STRUDL	Software error Notification Documents
		T-CLC-F-00296	GT STRUDL	Calculations for GTSTRUDL

Rev	Date	Number	<u><b>Type II, III, IIIA Tank Top Program</b></u>	Name
2	4/1/2002	C-SQP-G-00071	Type II, III, IIIA Tank Top Program	SQAP
	4/15/2002	PEC-SEG-02-0006	Type II, III, IIIA Tank Top Program	Version 1 Validation package
1	4/1/2002	WSRC-TR-2001-00393	Type II, III, IIIA Tank Top Program	Users manual
	4/25/2002	Type3ver1	Type II, III, IIIA Tank Top Program	8 Tank top Vertical loading evaluation test reports
1	4/1/2002	T-SEP-G-00001	Type II, III, IIIA Tank Top Program	Software Evaluation Package
1	4/2/2002	C-SWCD-G-00002	Type II, III, IIIA Tank Top Program	Software Classification Document
1	4/1/2002	C-VVR-G-00051	Type II, III, IIIA Tank Top Program	Validation of Type II, III, IIIA Tank Top Program



## 5.4 WSRC SQA Procedures List

Rev	Date	Number	Name
12	8/31/2003	WSRC-RP-92-225	Quality Assurance Management Plan
35	1/30/2004	WSRC-E7	Conduct of Engineering Glossary
35	1/30/2004	WSRC-E7	Conduct of Engineering Table of Contents
N/A	2/11/2004	WSRC S/RID	S/RID Compliance Data for "1Q QAP 20-1"
8	10/16/2003	WSRC 1Q 20-1	Software Quality Assurance
6	10/13/2003	WSRC E7 2.31	Engineering Calculations
3	9/28/2001	WSRC E7 2.41	Design Verification and Checking
1	7/15/2003	WSRC E7 5.01	Software Engineering and Control
2	9/19/2003	WSRC E7 5.03	Software Quality Assurance Plan
2	7/15/2003	WSRC E7 5.04	Software Project Management Plan
1	7/15/2003	WSRC E7 5.05	Software Classification
1	7/15/2003	WSRC E7 5.07	Evaluation of Existing and Acquired Software
2	7/15/2003	WSRC E7 5.10	Software Requirements
1	7/15/2003	WSRC E7 5.20	Software Design and Implementation
2	7/15/2003	WSRC E7 5.40	Software Testing, Acceptance and Turnover
1	7/15/2003	WSRC E7 5.61	Engineering & Scientific Software Distribution & Control
1	7/15/2003	WSRC E7 5.62	Computer Modification Tracker
1	8/29/2003	WSRC E7 5.80	Data Management
8	4/30/2003	WSRC E7 3.14	Design Authority Technical Reviews

## E7 - Conduct of Engineering

[Engineering Home Page](#) - [E7 Home Page](#)

---

### 5.5 Glossary (U) Revision No. 35 January 30, 2004

---

The number in brackets refers to the procedure in which the term and its definition are introduced.

**1-level CLI** – a component or equipment number that identifies a system, component hierarchy in a five (5)-field format. [1.30]

**2-level CLI** – a component or equipment number that identifies a system, equipment, component hierarchy in a seven (7)-field format. [1.30]

**Abandoned in Place** – equipment which has been designated on technical baseline documents to be permanently abandoned with no intent to return to service. The equipment remains in the facility, is isolated from operating systems, and is not normally maintained or routinely monitored. (See WSRC Manual 2S.) [1.05]

**Acceptable Supplier/Item Performance (Verification Method 4)** - a record of acceptable performance of a supplier's commercial grade items which provides justification for WSRC to accept the item for safety use. [3.46]

**Acceptance** - For the purposes of procedure 3.46, the employment of methods to produce objective evidence which provides reasonable assurance that a Commercial Grade Item (CGI) will perform its intended safety function. Acceptance encompasses two activities: 1) receiving inspection, and 2) verification of Critical Characteristics for Acceptance (CCFAs). [3.46]

**Acceptance Criteria** – specified limits placed on characteristics of an item, process, function, or service as defined in codes, standards, or other requirement documents. [5.10]

**Accident Analysis** – see WSRC Manual 11Q, Facility Safety Document Manual. [2.25]

**Acquired Software**

- Commercial grade software that will be qualified by SRS prior to being placed in service for its intended use in accordance with E7, Section 5.0 or QAP 20-1.
- Software that will be developed and qualified by a supplier in accordance with E7 Section 5.0 or QAP 20-1. [5.07]

**Administrative Controls** – see WSRC Manual 11Q, Facility Safety Document Manual. [2.25]

**ALARA** - an acronym for the concept of reducing radiation dose to levels As Low As Reasonably Achievable. ALARA is not a dose limit but constitutes a design philosophy that promotes the optimizing of design for keeping radiation doses to personnel as far below the applicable limits as social, technical, economic, practical and public policy considerations reasonably permit. [2.72]

**Alternate Replacement Item** - A replacement item not "like-for-like" to the original item, (i.e., it does not match the form, fit, and function of the item being replaced), however, it must fulfill the required safety functions. Alternate Replacement Items require a formal (documented) evaluation to ensure the safety functions will be maintained. Documentation of the evaluation is performed via a Design Change Package (DCP)/Design Change Form (DCF), when the item is part of the controlled Technical Baseline. If desired, additional evaluation may be documented using the Replacement Item Evaluation (RIE) form (OSR 19-341). [3.46]

**Alternatives Study** - an evaluation of alternatives to select the one that best meets the physical, functional, and operational requirements. [2.15]

**Annual Operating Plan** - the formal agreement of work scope, schedule (milestone), resources, and budgeted costs between WSRC and DOE that is summarized, documented, and authorized. [2.02]

**Anticipated** - frequency that is greater than or equal to 10<sup>-2</sup> per year and less than 1. [2.25]

**Approval Date** - the date a procedure is signed by the approval authority and approved for use. [1.01]

**Area** - the site area code identifies the physical area of the site to which the component applies. [1.30]

**As-Built Drawing** - a record drawing that reflects the existing or as-installed configuration of structures, systems, or components within specified design tolerances defined by codes, standards, or project requirements. [1.53]

**Assembly** - a combination of subassemblies, components or both which form a workable unit (e.g., control room panels, motor control centers, skid mounted equipment, etc.). [3.46]

**Assessment Package** - document used to record the evaluation of adequacy for a given SSC or group of similar SSCs to perform an identified function relative to the applicable design criteria. [3.41]

**Assessment/Verification** – see WSRC 1Q, Quality Assurance Manual. [2.31]

**Authenticator** – The person who performs authentication as defined in WSRC Manual 1B. [2.30]

**Authorization Basis (AB)** – see WSRC Manual 11Q, Facility Safety Document Manual. [3.41]

**Backfit Analysis** - the process by which an existing SSC is evaluated to determine if it is adequate to perform its upgraded safety function in terms of newly-established requirements and safety analyses. Backfit consists of a design assessment and if needed a cost benefit assessment. These activities are conducted by the Backfit Assessment Team and the results are reviewed and approved by an Engineering Review Board. [3.41]

**Baseline** - A specification or product that has been formally reviewed and agreed upon, that thereafter serves as the basis for use and further development, and that can be changed only by using an approved change control process. [5.61]

**Baseline Operating Data (BOD)** – a "non-critical" pre-defined qualitative or quantitative observation or data collection that does not require testing ranges or tolerances to satisfy a performance requirement. Values/data collected are identified as “expected”

values and are used to evaluate data/system performance. [2.26]

**Beyond Extremely Unlikely (BEU)** - a frequency of occurrence that is conservatively estimated to be less than  $10^{-6}$  per year. [2.25]

**Boundary** - defines locations of all physical interfaces of an SSC. It specifically identifies the points where these SSCs interface with the SSC being bounded. [1.05]

**Bounding Conditions** - parameters that envelop the normal, abnormal and accident environmental conditions an item is expected to meet during its lifetime in the facility (e.g., temperature, humidity, radiation, seismic response spectra, etc.) [3.46]

**Certification** – see WSRC Manual 1Q, Glossary. [3.46]

**Challenge** – To come close to or exceed the Safety Class or Safety Significant criteria. [2.25]

**Characteristics** – Any property or attribute of an item, process, or service that is distinct, describable, and measurable. [3.46]

**Closure** – the act of integrating into the baseline an implemented and accepted modification. [5.62]

**Cloud** - a method of identifying changes on a document by enclosing them with a scalloped line. [1.57]

**Code of Record (COR)** – see WSRC-TM-95-1, Engineering Standards Program Roles and Responsibilities. [3.41]

**Commercial Design Checking** - the process by which an engineering document is evaluated for accuracy against specific requirements. Indication of satisfactory completion of design checking is provided directly on the document that is checked. [1.56]

**Commercial Engineering Calculation** - a written record documenting an analytical or computational thought process used to support an engineering justification or to support the design or operation of a structure, system, or component. Commercial engineering calculations are defined as either type 1 commercial, type 2 commercial, or informal. [1.54]

**Commercial Grade Item (CGI)** - When used in a Safety application (SS/SC), an item is a CGI when it satisfies all three of the following criteria:

1. Not subject to design or specification requirements that are unique to SRS nuclear facilities;
2. Routinely used in applications other than SRS nuclear facilities, and
3. Is to be ordered from the manufacturer/supplier on the basis of specifications set forth in the manufacturer's published product description (for example, a catalog). [3.46]

**Commercial Grade Survey (Verification Method 2)** - activities conducted by WSRC or its agent to verify that a supplier of commercial grade items controls, through quality activities, the critical characteristics of specifically designated commercial grade item, as a method to accept those items for safety use. [3.46]

**Commercial Technical Review** - an evaluation of an engineering activity for technical adequacy, impact on safety, operations, maintenance, and the technical baseline. [1.58]

**Commodity Item** - an item having a generic application throughout a nuclear facility, which lends itself to bulk procurement (e.g., nuts, bolts, materials, O-rings, gaskets, indicator lights, fuses, relays, resistors, etc.).

**Competent Authority (Type B and Type A packaging)** – a national agency responsible under national law for the control or regulation of a particular aspect of the transportation of hazardous materials offsite. [4.05]

**Component** – a part or assembly of parts viewed as a functional entity within a system for purposes of providing a unique function within a system (e.g., pumps and valves) and that is identified by a unique identifier, e.g., Component Location Identifier (CLI). [1.30]

**Component Number** - a alpha-numeric identifier assigned to a component or unit of equipment to uniquely identify that component or unit of equipment. Component and equipment numbers are also known as Component/Process Location Identifier (C/PLI), Component Location Identifier (CLI) and Process Location Identifier (PLI). [1.30]

**Computer Program** - A combination of computer instructions and data definitions that enables computer hardware to perform computational or control functions. [5.61]

**Computer Program Error** - A condition of a computer program producing incorrect results or a condition deviating from an established baseline, including deviations from the current approved computer program and its baseline requirements. [5.61]

**Computer Program Modification Tracker (CMT)** – a system used to track, from approval to closure, a modification to baseline software (computer program file or associated document) identified as a Configuration Item in a Software Quality Assurance Plan. [5.62]

**Configuration** - the functional, physical, and operational characteristics of a structure, system, or component as defined in its technical baseline. [1.05]

**Configuration Control** - the integrated, systematic process to propose, coordinate, evaluate, and disposition changes in order to assure that each configuration change provides sufficient benefits for its impacts and consistency between a SSC's requirements, its technical baseline and the actual SSC is maintained. [1.05]

**Configuration Controlled SSC** – an SSC that meets the criteria for a CLI in accordance with procedure 1.30, Manual E7. [1.02]

**Configuration Item (CI)** – Hardware or software elements treated as a unit for the purpose of configuration control. Refer to Manual 1Q, QAP 20-1. [5.62]

**Configuration Management** – an integrated process that establishes accuracy and consistency among design requirements, physical configuration, and facility documentation, and maintains this consistency throughout the life of the facility. CM consists of the following program elements: program management, design requirements, document control, change control and assessments. (DOE-STD-1073-93)

**Confirmatory Test** - a test performed to obtain corroborating data for all or part of the range of one or more parameters included in a non-qualified data set. [3.70]

**Conforming ID** - a component number that conforms to this procedure. [1.30]

**Consequence of Occurrence (C)** - see [WSRC-IM-98-00033](#), Appendix B.

**Corroborating Data** - data that is used to help establish the technical credibility of non-qualified data. Corroborating data may include information developed from records searches, records of field walkdowns, design document reviews, and records of interviews with subject matter experts. [3.70]

**Credible Event** - an event which is more frequent than Beyond Extremely Unlikely. [2.25]

**Credible Failure Mechanism** - the credible manner by which an item may fail, degrading the item's ability to perform the component/system function under evaluation. This determination also considers mitigating factors (preventive maintenance, surveillance testing, etc.) which may prevent the failure from occurring. [3.46]

**Critical Characteristics for Acceptance (CCFA)** – Those properties or attributes of a CGI which, once selected and verified, provide reasonable assurance that the item will perform its intended safety function. An item's CCFAs may be a combination of design characteristics, along with other item characteristics. [3.46]

**Critical Spare Equipment** – Specific serialized items requiring identification, maintenance and storage in support of plant operations. These items are identified as a UTC in Passport. [1.31]

**Data** – a representation of facts, concepts, or instructions in a formalized manner suitable for communication, interpretation, or processing by humans or by automatic means. [5.80]

**Data Dictionary** – a collection of entries specifying the name, source, usage, and format of each data element used in a system or set of systems. [5.80]

**Data Element** – (1) a uniquely named and defined component of a data definition; a data "cell" into which data items (actual values) can be placed. For example, the data element AGE, into which data items



1, 2... can be placed. Note: The terms data element and data item are often used interchangeably or with the reverse definitions from those given here. No standard of use exists at this time. Syn: cell. (2) a data definition as in (1) that cannot be divided into other individually named data definitions. [5.80]

**Data Item** – a value contained in a data element. [5.80]

**Data Management Plan (DMP)** – the document for controlling data management activities by defining the administrative processes used to create, modify, and maintain data. [5.80]

**Data Modification Tracker (DMT)** – paper or electronic form used for processing a data modification request. [5.80]

**Data Set** – a named collection of related records (often synonymous with file). [5.80]

**Dedication** - A process undertaken to provide reasonable assurance that a Commercial Grade Item (CGI) to be used in a safety (SS/SC) application will perform its intended safety function and in this respect, it is deemed equivalent to an item designed and manufactured under the WSRC QA program. [3.46]

**Defense in Depth** – Defense in Depth refers to the broad-based layers of protection against uncontrolled releases of Hazardous Material to the environment. It is based on multiple layers of defense against release of Hazardous Materials so that no one layer by itself, no matter how good, is completely relied upon. This compensates for potential human and mechanical failures. [2.25]

**Design Adequacy Assessment** – the process of comparing a proposed SSCs design to a set of design criteria and qualitatively or quantitatively justifying acceptability of design if any applicable criteria are not met. [3.41]

**Design Agency** - a Technical Agency assigned by the Modification Manager to perform a software modification or the detailed design and analysis activities of a plant modification. [2.05]

**Design Authority** - the person or group responsible for the final acceptability of, and changes to, the design of software and its baseline or a structure, system or component and its technical

baseline. [1.10]

**Design Authority Engineer** - the person within the Design Authority organization that is assigned Design Authority responsibility. The Design Authority Engineer has review and approval authority for modifications to assigned structures, systems and components. [1.10]

**Design Authority Technical Review** - an evaluation of a modification for technical acceptability, impacts on safety, operation and maintenance, and impacts on the Authorization Basis. [3.14]

**Design Change Form (DCF)** - a form used to request, document, and process a change to a technical baseline document after its release for use. [2.37]

**Design Change Notice (DCN)** - a form used as part of a DCP to request, document, and process changes to existing drawings, quality inspection plans, specifications, and vendor documents. [2.38]

**Design Change Package (DCP)** - a package consisting of approved interim design documents, required instructions and specifications, the identification of prerequisite projects or tasks, and other documents required to implement and properly record a specifically defined design change. [2.38]

**Design Checking** - the process by which an engineering document is evaluated for accuracy against specific requirements. Documentation of this review is provided directly on the document that is checked. [2.40]

**Design Consistency** – a process to design systems within a facility or division such that similar or duplicate systems (i.e., multiple chiller units) are designed to be operated under the same procedure and maintained with a common set of spares. [2.05]

**Design Document for Software (DDS)** – the controlling document that specifies the design of a software product. [5.20]

**Design Freeze** - the point, determined by the Design Authority, at which changes to the project design require more control and approval than is afforded by a Design Change Form (i.e., a DCP is required). This is normally in anticipation of start up or turnover to

operations. [2.38]

**Design Function** - the operation an item is required to perform to meet the component or system design basis. [3.46]

**Design Verification** - the act of reviewing, testing, or otherwise determining and documenting whether the technical baseline (including DSA calculations) of a structure, system, or component meets specified requirements. [2.40]

**Development Drawing** - a drawing that is created and controlled entirely within a Technical Agency for use in the design, procurement, construction, fabrication, or installation of systems or components that are not part of a facility technical baseline. [2.30]

**Development Program Manager** – the Technical Agency point-of-contact assigned lead responsibility for technology development activities. [2.07]

**Division Managed Modification** - Modification funded from operating expense. [1.02]

**Direct Effect** – The output of the software is used in the operation of an SSC with no additional evaluation or review prior to taking action. [5.05]

**Direct Revision** - the process of revising a controlled document by directly changing the text or pictorial information without the use of any additional change paper. [1.53]

**Disposition** - the direct result or conclusion of a Technical Assistance Request. The preliminary disposition contains the conclusions that were reached, sets the schedule for, and summarizes the path forward for, the concluding disposition. The Technical Assistance Request is considered closed at the concluding disposition. [3.12]

**Document** - recorded information that describes, specifies, reports, certifies, requires, or provides data or results. For the purpose of the CM program, this includes paper copies (procedure, manuals, records, etc.), electronic media (such as word processor files and computer databases), and any other source(s) of information used to design or operate the facility or make sound technical decisions. It

includes both current or working documents and historical records. [1.05]

**Documented Safety Analysis (DSA)** – See WSRC Manual 11Q, Facility Safety Document Manual. [2.25]

**Effective Date** - the date that affected organizations are accountable to be in full compliance with the procedure including completion of all required training. [1.01]

**Engineering and Scientific Software** - Software that produces results that are used by engineering organizations in, or in support of, SRS technical documents. [5.61]

**Engineering Calculation** - a written record documenting an analytical or computational thought process used to support an engineering justification or to support the design or operation of a structure, system, or component. Engineering calculations are defined as either type 1 or type 2 calculations. [2.31]

**Engineering Calculation Software** - the computer programs, procedures, rules, and associated documentation and data pertaining to performing Engineering Calculations using a computer or programmable device. This software includes, but is not limited to, software used in programmable devices such as calculators, purchased (e.g., MATHCAD, EXCEL, etc.) or Site developed software, software layers, macros, routines, operating parameters, and data tables. The data referred to in this definition do not include the input and output data for the subject calculation. [2.31]

**Engineering Document** - design input, design output, and related documentation generated in support of a new structure, system, or component (SSC) or to support a plant modification. [1.20]

**Engineering Document Number** - a combination of alpha and numeric characters that uniquely identify an individual engineering document. [1.20]

**Engineering Review Board (ERB)** - the Engineering Review Board provides an oversight and approval function for Backfit Analysis activities. Membership is limited, and members will be selected by the Division Chief Engineer based on overall experience, skill mix needs, and facility familiarity. In the event that a Backfit Analysis

involves more than one facility, all facilities impacted by the analysis will be represented on the ERB. The ERB is responsible for reviewing and approving the Backfit Analysis package. [3.41]

**Equipment** – An engineered item that includes characteristics or salient features based on conditions and operating parameters of a facility. Equipment includes items such as pumps, motors, tanks, valves, instruments, panels, etc. used for facility operation. [1.30]

**Equivalency Evaluation** - a technical evaluation performed to confirm that an alternative item, not like-for-like to the original or installed item, will satisfactorily perform its intended function once in service. This term is synonymous with "Equal-to-or-Better-Than Evaluation." [3.46]

**Equivalent Safety** – See WSRC Manual 19Q, Transportation Safety [4.06]

**Essential Comment** – Comment that requires resolution. [1.01]

**Essential Document** - document type that (1) demonstrates that the SSCs addressed by the authorization basis will perform their active safety function and (2) is used by engineering and operations to quickly respond to plant events. [1.05]

**Evaluation Guideline (EG)** – Public hazardous material dose/exposure value that the safety analysis is evaluated against. [2.25]

**Existing Software** – Software that has been developed using an engineering methodology that is not in accordance with E7, Section 5.0, or a quality program that is not in accordance with QAP 20-1. [5.07]

**Extremely Unlikely** - frequency which is greater than or equal to 10<sup>-6</sup> per year and less than 10<sup>-4</sup> per year. [2.25]

**Facilities** – land, buildings and other structures, their functional systems and equipment, and other fixed systems and equipment installed therein including site development features outside the plant, such as landscaping, roads, walks, and parking areas; outside lighting and communications systems; central utility plants; utilities supply and distribution systems; and other physical plant features.

[2.12]

**Facility Design Description (FDD)** - the facility technical document that defines the top-level functions, performance, design, physical, testing, interface, operating, and maintenance requirements for a facility. The FDD provides the single source for communicating and controlling the facility level requirements. [2.12]

**Facility Technical Baseline** - all technical baseline documents under the control of a facility Design Authority. [2.37]

**Failure Modes and Effects Analysis** - an evaluation of credible failure mechanisms and their effect on system/component function. [3.46]

**Failure Mode** - the effects or conditions which result from an item's credible failure mechanisms. [3.46]

**Federal Facilities Agreement (FFA)** - the agreement signed by the Environmental Protection Agency (EPA), South Carolina Department of Health and Environmental Control (SCDHEC), and United States Department of Energy (DOE) that regulates the site waste remediation process and integrates the requirements of the Comprehensive Emergency Response, Compensation, and Liability Act (CERCLA) and the Resource Conservation and Recovery Act (RCRA). [1.40]

**Feasibility Study** - an evaluation of a proposed plant modification performed to aid in determining the scope and functional requirements of the modification. A feasibility study may include a technology assessment. [1.02]

**Field Change Request (FCR)** - an engineering design document used to request and process a change to an issued engineering document. [1.55]

**Field Sketches** - a drawing created in conjunction with design output documents to assist in the fabrication or installation of structures, systems, or components, or a drawing used for maintenance or modification instructions to ensure clear direction. [2.30]

**Final Inspection** - inspections that are typically performed during the initial installation or major modification of items/systems up to

and including tests performed prior to facility operation. An inspection is considered final when it addresses all inspections required within the scope of a work package or completes inspections within the scope of a work package that were not previously completed in-process. (Ref. 1Q Glossary) [2.36]

**Final Documented Safety Analysis** – Safety Analysis that meets 10 CFR 830 requirements and DOE-STD-3009-94 guidance or a WSRC approved Documented safety Analysis that is considered by DOE to fulfill the commitments made in the standards/Requirements Identification Documents (S/RID) as documented in the Compliance Assessment and Implementation Report for 10 CFR 830.

**Final Safety Analysis** - Safety Analysis that meets DOE Order 5480.23 requirements and DOE-STD-3009-94 guidance or a WSRC approved Authorization Basis that is considered by DOE to fulfill the commitments made in the standards/Requirements Identification Documents (SRID) as documented in the Compliance Assessment and Implementation Report for DOE Order 5480.23. [2.25]

**First-Time Use** – See WSRC Manual 19Q, Transportation Safety [3.15]

**First-Time Use technical review** – See WSRC Manual 19Q, Transportation Safety [3.15]

**Fit** - those characteristics of an item that define the location and connection of installation interfaces (e.g., dimensions, matchup, and method of mounting). [3.46]

**Form** - those characteristics of an item that define the physical envelope (e.g., type or style of item, weight, material composition, and dimensional shape). [3.46]

**Formal Design Review** - an independent assessment of the technical adequacy of selected portions of the plant modification task input documents and an independent assessment for compliance of task output documents with the plant modification requirements in the task input documents. [2.65]

**Formal Design Review Board (Board)** - the selected group of individuals that shall review and comment on the Data Package

submitted for Formal Design Review. [2.65]

**Formal Design Review Data Package (Data Package)** - Formal Design Review information that includes the approved task input documents and task output documents and normally any supporting analytical and test results for a plant modification under review. The data package may include the results of the Technical Risk Analysis. [2.65]

**Formal Design Review Methodology Manual** - procedure implementation information containing detailed supplementary material intended to assist all participants to hold effective Formal Design Reviews consistent with the intent of this procedure. [2.65]

**Function** - the operation an item is required to perform to meet the component or system design basis. [3.46]

**Functional Acceptance Criteria** - a measurable set of characteristics used to define the acceptable performance that satisfies a functional requirement(s). This is used as the input to the Manual 5E process. Functional Acceptance Criteria Documents are written to the level of system performance characteristics, so that acceptance tests can be developed. [2.26]

**Functions and Requirements** – those performance criteria and design constraints which the structure, system, or component must meet in order to be acceptable. [2.15]

**Functional Acceptance Criteria (FAC)** – a measurable set of characteristics used to define the acceptable performance that satisfies a testable performance requirement. FAC are written to the level of system performance characteristics, so that tests can be developed. TAC, GTD, and BOD are specified from FAC. [2.26]

**Functional Classification** - a graded classification system used to determine minimum requirements for SSCs (i.e., design, operation, procurement, and maintenance requirements). The four Functional Classifications in order of precedence are Safety Class, Safety Significant, Production Support, and General Services. There are three possible statuses for a Functional Classification; Preliminary, Interim and Final. The status is the same as the status of the Safety Analysis used to determine the classification. The statuses preliminary and interim apply only to Safety Class and Safety



Significant classifications. Production Support and General Services classifications are based on information that is independent of the Safety Analysis status and may always be considered final. [2.25]

**Functional Mode** - the functional mode of a component is determined to be either active or passive based on the definitions of those terms given in WSRC-TM-93-9. [2.25]

**General Document** - document types that provide engineering details necessary for construction and are updated at the discretion of the Design Authority. [1.05]

**General Services** - the functional classification assigned to all SSCs not required to provide a Safety Class, Safety Significant, or Production Support function. All SRS SSCs are, as a minimum, classified as General Services to assure that proper design, operations, and maintenance requirements are assigned to provide for the health and safety of the worker and environment and to assure compliance with other Site requirements. [2.25]

**General Test Data (GTD)** – a "non-critical" pre-defined qualitative or quantitative measurement that requires testing to verify a performance requirement. [2.26]

**Graded Approach** - a process by which the level of analysis, documentation, and actions necessary to comply with a requirement are made commensurate with a number of considerations, including the relative importance to safety, safeguards, and security; the magnitude of any hazard involved; the life cycle stage of a facility; the programmatic mission of a facility; the particular characteristics of a facility; and any other relevant factor. (DOE-STD-1073-93)

**Grassroot Modification** – a modification which adds a new system or facility not in the control of, or critical to, operations and where the modification does not impact existing facilities except for the points of interface. Grassroot modification points of interface with existing facilities are controlled as Plant Modifications. [2.30]

**Hazard** – see WSRC Manual 11Q, Facility Safety Document Manual. [2.25]

**Hazard Analysis** – see WSRC Manual 11Q, Facility Safety

Document Manual. [2.25]

**Hazardous Material** - any solid, liquid, or gaseous material that is toxic, explosive, flammable, corrosive, or otherwise physically or biologically threatening to health. [Candidate Hazards as used in this procedure include radioactive materials and hazardous chemicals that are not common Hazardous Material as defined in the EMPP 6Q-001, Manual 6Q.] [2.25]

**Hold Point** - a mandatory inspection activity beyond which work shall not proceed until 1) inspection is performed and acceptance is authenticated; or 2) written release is authorized by Engineering. [2.36]

**Human Factors Engineering (HFE)** - the application of information about human behavior, abilities and limitations in the design process to ensure safe, comfortable, and effective use of HSIs. [2.18]

**Human Factors Engineering Plan (HFEP)** - the governing document for the HFE engineering process that describes the HFE requirements and responsibilities, tailored for facilities, systems or projects (applying a graded approach). [2.18]

**Human-System Interface (HSI)** - a point of interaction between personnel and equipment (displays, computers, alarms, controls, decision aids, workstations, communication devices, and environments) where the resulting human performance impacts system performance. [2.18]

**Implementing Agency** - the organization assigned to implement the physical work associated with the plant modification or implementation activities associated with the software modification (translation of design into code). [2.38]

**Independent Inspection** - examination or measurement to verify whether an item or activity conforms to specified requirements; performed by an individual who is qualified and certified in accordance with Procedure Manual 1Q, Quality Assurance Manual, Procedure 2-5, "Training, Qualification and Certification of Inspection Personnel", and Procedure 10-1, "Inspection"; and, who did not accomplish the task to be inspected and was not involved in

the performance of the activity. [2.36]

**Independent Review** - There are two types of Independent Reviews: Type 1 and Type 2. A Type 1 Independent Review (IR-1) is the review of a document performed by an individual knowledgeable in the area of review to ensure that the assumptions, methodology and resulting product reflect sound engineering judgment. An individual other than the individual that did the work being reviewed conducts the Independent Review. A Type 2 Independent Review (IR-2) is similar to an IR-1 with the added requirement that it be conducted by an individual subject to a different technical direction (i.e., not assigned to the same project or task). [5.03]

**Indirect Effect** – The output of software is used in the operation of an SSC but is subject to evaluation or review prior to taking action. [5.05]

**Individual Review of Calculation** - Review performed by an individual other than the calculation preparer to evaluate technical adequacy of the calculation approach, ensure internal completeness, consistency, clarity and correctness of arithmetic, and verify the assumptions are traceable to the requirements. [2.31]

**Industrial Modifications** - Modifications outside a nuclear facility and their safety support facilities (WSRC-RP-94-1268) to GS and PS SSCs which are involved in operations in which material is chemically or physically transformed from one state into another and/or pose a significant risk to personnel safety. This definition includes chemical operations, handling/transportation of hazardous materials, power and water distribution systems, power/steam production, and fire protection. [1.02]

**Informal Calculation** - a calculation supporting engineering designs having no significant technical, safety, or economic risk. Informal calculations use a graded approach toward technical and computational detail and are controlled internally and maintained within engineering files. [1.54]

**Infrastructure Modifications** - Modifications outside a nuclear facility and their safety support facilities (WSRC-RP-94-1268) to GS and PS SSCs that are not part of an Industrial Modification. This definition includes roads, railroads, bridges, structures (including administrative buildings and warehouses), telecommunications,

dams, landfills and similar items. [1.02]

**In-Process Inspection** - inspections that are typically performed during the initial installation or major modification of items/systems up to and including tests performed prior to facility operation. An inspection is considered in-process when it is performed, completed, and the reporting document is reviewed and closed prior to all inspections within the scope of a work package being complete. (Ref. 1Q Glossary) [2.36]

**Inspection** - examination or measurement to verify whether an item or activity conforms to specified requirements. [2.36]

**Install** - placement/securing of equipment, conductor or conduit/piping per design prior to being energized. [3.80]

**Integrated Safety Management System (ISMS), Tailored Approach To** - The practice of specifying requirements, design attributes, and operating strategies that result in safe and successful DOE mission accomplishment at minimum cost.

**Interim Drawing** – a drawing issued to support a Design Change Package (DCP) and issued as part of the DCP. [2.30]

**Interim Safety Analysis** - an existing facility, DOE approved safety documentation scheduled (with DOE concurrence) for replacement. These are not considered by DOE to fulfill the commitments made in the SRIDs as documented in the Compliance Assessment and Implementation Report for 10 CFR 830. [2.25]

**Item** - An all-inclusive term used in place of any of the following: appurtenance, assembly, component, equipment, material, module, part, software, structure, subassembly, subsystem, system, or unit.

**Justification for Continued Operation (JCO) /Technical Justification for Continued Operation (TJCO)**– see WSRC Facility Safety Document Manual 11Q [3.41]

**Lay-up Modification** - modifications performed on structures, systems, or components that have been removed from service to accomplish activities such as:

- protecting them from degradation in accordance with a facility or system

lay-up plan, or

- providing for running of equipment outside normal operating configuration to support lay-up, partial shutdown, or complete shutdown.

Lay-up modifications are not permanent plant modifications. Lay-up modifications cannot be left in place during normal system operation. [2.06]

**Lay-up Plan** – a plan prepared for the preservation of equipment and systems to be removed from service for an extended period of time. [2.06]

**Level A** - See WSRC Manual 1Q, [QAP 20-1](#). [5.05]

**Level B** – See WSRC Manual 1Q, QAP 20-1. [5.05]

**Level C** – See WSRC Manual 1Q, QAP 20-1. [5.05]

**Level D** - See WSRC Manual 1Q, QAP 20-1. [5.05]

**Level E** - See WSRC Manual 1Q, QAP 20-1. [5.05]

**Level of Control (LOC)**- one or more structures, systems, components, administrative controls, or inherent features (e.g., chemical properties, gravity, physical constants, underground location) that can be readily expected to act to Prevent or Mitigate the release of Hazardous Material to an unwanted location. [2.25]

**Like-for-Like Item** - An item having the same form, fit and function attributes as the item it replaces. "Identical" items (same make, model number, characteristics, etc., as determined by being obtained via the same purchase order) are a subset of like-for-like items.

**Master Equipment List (MEL)** – A detailed listing of SSCs, special tools, and critical spare equipment contained in the Site Work Management System (Passport). [1.31]

**Metadata** – data that describes other data; for example, a data dictionary contains a collection of metadata. [5.80]

**Minor Modification** - facility modification that meets the following conditions as further defined by the operating division: [1.02]

- relatively low cost
- does not require significant or long term commitments of engineering, crafts, or work control
- has few or no discipline interfaces

- is simple to implement and is an obvious solution to a specific problem
- does not involve an unreviewed safety question
- does not impact the design basis of the Structure, System, or Component (SSC) being modified
- involves few document changes

**Mitigate** - to lessen the severity of consequences of an event. [2.25]

**Mitigated** –taking credit for preventors and/or mitigators. [ 2.25]

**Modification** - a physical change to a configuration controlled Structure, System or Component (SSC). Modifications include new facilities, and additions, deletions or changes to existing facilities [1.02]

**Modification Manager** - person designated by the Design Authority to have overall responsibility for a plant modification. [2.05]

**Modification Team** - team, comprised of members from the operating division, Projects Engineering and Construction Division (PE&CD), and supporting organizations, led by the project manager and with total responsibility for all aspects of the development and execution of assigned modifications.

**Modification Traveler (MT)** - a document or electronic system used to track a modification from initiation to closure and may be used to document and control design input requirements and criteria. [2.05]

**Monitored Parameters** - a measurable characteristic of a system or component that provides information (e.g., flow, temperature, pressure) to evaluate the performance of a system or component. [3.04]

**New Application** – software that has not yet been baselined, is a new deployment of existing software or has been specifically developed to meet new requirements. [5.01]

**New Information (NI)** - see WSRC Facility Safety Document Manual 11Q [3.41]

**Non-conforming ID** - a component number that does not conform to this procedure. Such IDs are those component numbers that were derived by procedures that existed prior to this procedure (legacy

IDs). [1.30]

**Non-Essential Comment** – Comment that is incorporated at the discretion of the E7 Manual Coordinator. [1.01]

**Non-Facility Based SSCs** - SSCs (or items) that cannot be associated with a SRS facility and functionally classified in accordance with Manual E7, Procedure 2.25 (e.g. standard waste boxes and 55 gallon storage drums). [3.10]

**Non-qualified Data** - data for which documentation may not exist to demonstrate their compliance with current QA or procedural requirements. [3.70]

**Non-Technical Baseline (NTB)** - Reference documentation (drawings, etc.) related to facility SSCs but not included in the Facility's Technical Baseline as defined by E7, 1.05 (i.e., not configuration controlled). [1.20]

**Nuclear Facility** – see WSRC Manual 11Q, Facility Safety Document Manual. [2.25]

**Nuclear Production Facility** - a facility whose primary mission is to analyze, produce, process, or store nuclear materials. [2.25]

**Offsite shipment** - See WSRC Manual 19Q, Transportation Safety [4.05]

**Onsite In-Commerce (OSIC)** – See WSRC Manual 19Q, Transportation Safety [4.06]

**Onsite Package Authorization Form (OPAF)** – See WSRC Manual 19Q, Transportation Safety [4.06]

**Onsite Safety Evaluation Review (OSER)** - See WSRC Manual 19Q, Transportation Safety [4.06]

**Onsite Safety Assessment (OSA)** - See WSRC Manual 19Q, Transportation Safety [4.06]

**Onsite transfer** – See WSRC Manual 19Q, Transportation Safety [4.06]

**Open Items** - unconfirmed or unchecked input, assumptions, or results that must be verified. A type 1 calculation containing open items is either a preliminary calculation or committed calculation and may not be designated as confirmed until all open items are closed. [2.31]

**Package** - See WSRC Manual 19Q, Transportation Safety [3.15]

**Package Authorization**– the summary approval document based on a graded technical safety evaluation consistent with the associated hazard and issued by an authority commensurate with the associated hazards. These include:

- DOE, NRC or IAEA Certificate of Compliance.
- Onsite Package Authorization Form
- Type A Package approval documentation
- Industrial package documentation
- Strong-Tight container documentation [3.15]

**Package Contents** – anything that is loaded into the packaging that is not part of the packaging [3.15]

**Packaging (radioactive)** - See WSRC Manual 19Q, Transportation Safety [3.15]

**Part** - items from which a component is assembled (e.g., resistors, capacitors, wires, connectors, transistors, lubricants, O-rings, springs, bearings, gaskets, bolting, seals, etc.). [3.46]

**Part Number** -an identifier assigned by a supplier for a commercial grade item. Part number as used herein can also include identifiers such as model number, material type, grade, catalog reference number, etc. [3.46]

**Peer Inspection** - examination or measurement to verify whether an item or activity conforms to specified requirements; performed by an individual who is task and inspection qualified in accordance with Procedure Manual 1Q, Quality Assurance Manual, Procedure 10-1, “Inspection”; and, who did not accomplish the task to be inspected, but, may have been involved in the performance of the work activity. [2.36]

**Performance-Based Specification** – a statement of requirements in



terms of required results with criteria for verifying compliance, without stating methods for achieving the required results. [2.14]

**Performance Monitoring** - systematic review, recording, and trending of monitored parameters of systems and components to measure and assess the impact of any performance changes of a particular system or component. [3.04]

**Performance Requirement** – a criteria that must be verified by analysis, inspection, review, or testing to demonstrate acceptable technical performance of a plant modification. [2.26]

**Performing Entity** – The companies comprised of Westinghouse Savannah River Company, Bechtel Savannah River, Inc., BWXT Savannah River Company, BNFL Savannah River Corporation, CH2 Savannah River Company, etc.

**Physical, Functional, and Operational Requirements** - those characteristics against which the structure, system, or component will be evaluated to determine acceptability. [2.15]

**Plant Event** - an unplanned, abnormal event that occurs during normal plant operations. [1.05]

**Plant Modification** - the addition, deletion, or change to the configuration of a configuration controlled SSC and its technical baseline. A plant modification will always include a technical baseline modification and a physical modification. [2.05]

**Plant Modification Technical Baseline** - all technical baseline documents generated for structures, systems, and components as part of a plant modification. [2.37]

**Plant Modification Technical Review** - an independent evaluation for compliance of the technical baseline task output with the technical baseline task input and an evaluation of the technical adequacy of selected portions of the technical baseline task output. The three types of Plant Modification Technical Reviews are Formal Design Review (FDR), Design Authority Technical Review (DATR), and Design Verification by Interdisciplinary Evaluation (DVIE). [2.60]

**Pollution Prevention (P2)** - the use of any process, practice, or

product that reduces or eliminates the generation and release of pollutants, contaminants, hazardous substances, and wastes into all environmental media including ground, water, and air and/or conserves natural resources, including energy conservation. Within DOE, pollution prevention includes all aspects of source reduction as defined by the U.S. Environmental Protection Agency (EPA) in the Pollution Prevention Act and incorporates waste minimization by expanding beyond the EPA definition of Pollution Prevention to include recycling. [1.41]

**Pollution Prevention in Design (P2D)** - a process of designing for pollution prevention to minimize raw material consumption, energy consumption, waste generation, health and safety impacts, and ecological degradation over the entire life of the facility. [1.41]

**Pollution Prevention Design Assessment (P2DA)** - a Pollution Prevention Opportunity Assessment conducted during the design phase of the new products, processes, and facilities. [1.41]

**Pollution Prevention Design Opportunity (P2DO)** - specific design changes that would prevent or minimize the anticipated waste streams. [1.41]

**Pollution Prevention Opportunity Assessment (PPOA)** - a review of an operation, process, activity, or waste/pollution stream with the objective of identifying and evaluating ways to eliminate or reduce waste/pollution and/or conserve natural resources. [1.41]

**Post-Installation Tests/Post-Maintenance Tests (included in Verification Method 1)** - activities conducted after installation of a commercial grade item to verify required critical characteristics prior to placement in operation. An element of the "Special Tests and Inspection" method to accept an item for safety use. When specific post-installation acceptance criteria are specified in a RICP or CGD, a Post-Installation Test (PIT) is hung on the item to identify that one or more additional dedication activities remain to be performed. When the post-installation acceptance criteria are specified in the Work Package, the test is referred to as a Post-Maintenance Test (PMT) and the PIT tag is not hung on the item. [3.46]

**Power Services** - plant systems that provide steam, electricity, domestic water, process water, or sanitary waste treatment. [3.80]

**Power Services Utilization Permits (PSUPs) Parts A, B, and C** – a form used to document the request for changes to power services (Parts A and B) and to document verification and adequacy of protective devices for site electrical systems (Part C). [3.80]

**Preliminary Safety Analysis** - the safety analyses performed during the development of the design of a plant modification or new facility. [2.25]

**Prevent** - to lessen the frequency of an event. [2.25]

**Primary Documentation** - documentation consisting of the technical baseline, memoranda, laboratory notebooks, or other documents that are used to support the analyses or conclusions contained in a technical report. [3.60]

**Probability of Occurrence (P)** - see [WSRC-IM-98-00033](#), Appendix B.

**Process Software** – Software that is functionally classified as part of an SSC. [5.05]

**Procurement Quality Requirement** - those necessary and sufficient measures identified to ensure that the deliverables in a procurement activity will be provided in accordance with the technical and supplemental requirements specified in the procurement documentation. Procurement Quality Requirements are derived from and aligned with the technical requirements generated by the Responsible Engineer, and are applied on a graded approach commensurate with the functional and technical requirements. (3E). [3.10]

**Production Support** - the Functional Classification that applies to those SSCs necessary to support continued operation of a Nuclear Production Facility and to selected environmental monitoring and Emergency Plan communications devices. [2.25]

**Professional Engineer Certification** - the statement of responsibility, seal and signature applied by the Registered Professional Engineer on any document. [1.40]

**Project Team** - all SRS employees who perform work under the

direction of the Project Manager or designee. [2.65]

**Public** - population outside the SRS boundary at the time of the event. [2.25]

**Quality Inspection Plan (QIP)** - a document that uniquely identifies, on a plant modification basis, the inspection and test requirements, acceptance criteria, and responsibilities of the Implementing Agency for items and actions identified in the Quality Assessment Report. QIPs may also be used for specifying additional inspection or test requirements identified by the Design Agency to verify that specified design requirements have been satisfied. [2.36]

**Quality Requirement** - a characteristic that must be present for a structure, system, or component to function safely and effectively in its intended operating environment. [2.36]

**Radioactive Material** – See WSRC Manual 19Q, Transportation Safety [3.15]

**"Ready for Formal Design Review" Memo** - documentation from the Design Team Leader verifying selected task input and output documents are ready for a Formal Design Review and is issued to the Formal Design Review Coordinator and Board. [2.65]

**Receiving Inspection (RI)** - a post delivery inspection performed as part of the acceptance process to verify that ordering requirements have been met. Receiving Inspection consists of a verification of all criteria specified on the RICP. Verifications performed remotely by on-site facilities such as bench testing, material mechanical property testing, electrical characteristic verification, etc., are also considered to be part of the receiving inspection even though they are not performed by FSS Quality Services Section. Within this procedure, a distinction is made as to who performs this activity. When the receiving inspection is performed by the FSS Quality Services Section, it is referred to as "R.I." When the receiving inspection is performed in the field, it is referred to as "field inspection" or "field dedication." "R.I.," "field inspection," or "field dedication" may also be performed to upgrade an item that was purchased Level 3. [3.46]

**Receiving Inspection Criteria Package (RICP)** - a listing of the minimum acceptance and/or receiving inspection criteria that the Responsible Engineer has determined are required in order to provide

a reasonable assurance that the Level 1 or Level 2 item received is the item that was ordered. RICPs may also be created to upgrade an item that was purchased Level 3. [3.46]

**Record Drawing** - a controlled drawing that is used to support grassroot (new) modifications or to reflect the as-installed configuration (see as-built). [2.30]

**Redline** - mark-up of engineering documents reflecting approved changes. The redline mark-up constitutes a record of change (until incorporation) and is part of the implementing organization design or work documents. [1.57]

**Reference ID** - an alternate number that identifies a site component on an area specific drawing or sketch or in an area specific satellite database. [1.30]

**Registered Professional Engineer (RPE)** - an engineer registered in the State of South Carolina to provide professional engineering services as described in the South Carolina Code of Laws, Title 40, Chapter 22. [1.40]

**Regression Testing** – Selective testing of an item, system, or component to verify that modifications have not caused unintended effects and that the item, system, or component complies with its specified requirements. Refer to Manual 1Q, QAP 20-1. [5.40]

**Reliability** - a measure of the ability of a system or component to perform as required. [3.04]

**Replacement item** - a new item or an item that replaces an original or installed item. A replacement item is classified as an "alternate replacement" or a "like-for-like replacement." [3.46]

**Replacement Item Evaluation/Commercial Grade Dedication Package (RIE/CGD)** – one means to document the attributes and process by which a commercial grade item will be determined to be acceptable for use in safety class or safety significant applications. Other acceptable means are through the use of a Receipt Inspection Criteria Package (RICP), Work Package (W/P) instructions, or some combination of the RICP, W/P instructions, and RIE/CGD. [3.46]

**Requirements Specification for Software (RSS)** – the controlling

document for specifying the requirements of a software product. [5.10]

**Requirements Traceability Matrix (RTM)** – a document that traces requirements from the Requirements Specification for Software (RSS) to design elements in the DDS and to the completed testing documentation. [5.20]

**Risk Factor (RF)** - see [WSRC-IM-98-00033](#), Appendix B.

**Risk Handling** – see [WSRC-IM-98-00033](#), Appendix B.

**Risk Level** – see [WSRC-IM-98-00033](#), Appendix B.

**SSC Category** - grouping or combining SSCs having similar materials, service conditions, environmental conditions, and degradation history and tendencies. [3.48]

**SSC Examination Plan** - summary tables of SSCs subject to examination or test and their required examination and test frequencies. [3.48]

**Safe Mission Essential** – the practice of specifying requirements, design attributes, and operating strategies that result in safe and successful DOE mission accomplishment at minimum life-cycle cost. [1.02]

**Safety Analysis** - see WSRC Manual 11Q, Facility Safety Document Manual. [2.25]

**Safety Analysis Report for Packaging (SARP)** - See WSRC Manual 19Q, Transportation Safety [4.05]

**Safety Basis (SB)** – See WSRC Manual 11Q, Facility Safety Document Manual.

**Safety Basis Strategy (SBS)** – a planned safety analysis approach for a proposed modification that is developed in accordance with procedure 1.10, Manual 11Q. [2.05]

**Safety Class** - the functional and safety classification that applies to those structures, systems, or components or Administrative Controls whose preventative or mitigative function is necessary to keep

hazardous material exposure to the public below the Offsite Evaluation Guidelines. [2.25]

**Safety Class Function** - a preventative or mitigative function that must be performed to keep radiological exposure to the Public from challenging the Offsite Evaluation Guidelines. [2.25]

**Safety Class SSC** – an SSC that performs a Safety Class function. [2.25]

**Safety (SC/SS) Component** - a plant component or part thereof, necessary to assure the nuclear safety requirements of Manual E7, 2.25 are met for SSC(s) functionally classified as safety class or safety significant. [3.46]

**Safety SSCs** - the set of Safety Class and Safety Significant structures, systems, and components for a given facility. [2.25]

**Safety Significant** - the functional and safety classification that applies to those structures, systems, and components or Administrative controls not designated as safety class SSCs but whose preventive or mitigative function is a major contributor to defense in depth (i.e., prevention of uncontrolled material releases) and/or worker safety as determined from hazard analysis. [2.25]

**Safety Significant Function** – a preventive or mitigative function whose performance is a major contributor to Defense in Depth (i.e., prevention of uncontrolled material releases) and/or Worker safety as determined from Hazard Analysis. [2.25]

**Safety Significant SSC** – an SSC that performs a Safety Significant Function. [2.25]

**Separation Group** - a field in the component number containing a single alpha character code (e.g., "A", "B", "C", etc.) and used to ensure that electrical cable will be routed in separate raceways for voltage, fire protection, or other reasons when redundant or backup circuits are required. [1.30]

**Service Level** - a field in the component number containing a single alpha character that designates the highest voltage level for the raceway systems, cables and jumpers. [1.30]

**Site Unit Area Clarifier** – a site area designator or an expression used to differentiate two or more items or functional operations that perform identical or similar functions. [1.30]

**Software** - Computer programs (including supporting operating systems, compilers, etc.), procedures, rules, associated documentation and data pertaining to the operation of a computer system. [5.61]

**Software Configuration Management (SCM)** – a discipline applying technical and administrative direction to identify and document the functional and physical characteristics of software configuration items, control modifications to the characteristics, record and report change processing and implementation status, and verify compliance with specified requirements. [5.62]

**Software Configuration Status Accounting (SCSA)** – the process of recording and reporting the status of approved computer programs, software technical documents, proposed modifications, and implementation of approved modifications. [5.62]

**Software Error Notification (SEN)** - The document used to notify appropriate persons of software errors. [5.61]

**Software Evaluation Package (SEP)** – A set of documents that is utilized to demonstrate adequate confidence that the existing or acquired software is acceptable for its intended end use. [5.07]

**Software Inventory Database** - Electronic and/or paper records that contain the configuration management and action tracking information required by this procedure for the Software Library management. [5.61]

**Software Library** - A controlled collection of software for distribution. [5.61]

**Software Modification** – the development and procurement of software as well as changes to configuration controlled software. [5.01]

**Software Modification Package (SMP)** – a Computer Program Modification Tracker and supporting documents. [5.62]



**Software Owner** - the individual accountable for all technical, administrative, and financial aspects of software or programmable devices. [2.31]

**Software Problem** - An anomaly that may produce a software error. Once an anomaly or problem is detected, an analysis is performed to determine if the anomaly is or has produced/resulted in an actual error. [5.61]

**Software Project Management Plan** - the document for controlling software project management activities by defining the administrative processes to develop the software products prior to final acceptance of the product by the Software Owner. [5.04]

**Software Provider** - Developer or vendor of a computer program. [5.61]

**Software Quality Assurance Plan (SQAP)** – the governing document for the software engineering process, including development, acquisition, configuration management and verification activities. [5.03]

**Software Test Case** – A specific set of test data and associated inputs, execution conditions, and expected results that determine whether the software being tested meets functional requirements. [5.40]

**Software Test Plan (STP)/Test Document** – A document or collection of documents for executing, controlling, and documenting the software testing process. [5.40]

**Software Tools** –computer programs used in the development, testing, analysis, or maintenance of a program or its documentation (e.g., assemblers, comparators, cross-reference generators, compilers, computer-aided software engineering tools, configuration and code management software, decompilers, disassemblers, editors, flowcharters, monitor test case generators, and timing analyzers.) [5.03]

**Source Verification (Verification Method 3)** - activities witnessed at the supplier's facilities by WSRC or its agent for specific items to verify that a supplier of a commercial grade item controls the critical

characteristics of that item, as a method to accept the item. [3.46]

**Special Conditions and Requirements** - attributes beyond supplier normal parameters (e.g. seismic, environmental, operational requirements) required to satisfy authorization basis and operational requirements. [3.46]

**Special Tests and Inspections (Verification Method 1)** - activities conducted after receipt of a commercial grade item to verify one or more critical characteristics as a method to accept the item for safety use. [3.46]

**Specification** – a technical document used to provide a detailed description of requirements for items and/or services including installation. [2.14]

**SRP Drawing** - a drawing that was created prior to April 1989 and has not been revised to meet the requirements of this procedure. [2.30]

**Statistical Methodology** – Method used to perform accident analyses consequence calculations whereby distributions expressing the uncertainty in inputs are combined using Monte Carlo or similar mathematical techniques to calculate a result. This method differs from many traditional methods that use values combined directly together to calculate a result. [2.25]

**Strong-Tight container** - See WSRC Manual 19Q, Transportation Safety [3.15]

**Structural Integrity** - the demonstrated capability of an SSC to perform its intended design functions under all operational and design basis events. [3.48]

**Structural Integrity Baseline** - measurements and analyses that establish the status, configuration, setting, or condition of an item. The structural integrity baseline of an item may be established prior to it being placed into initial operation, while it is in service, or after repair or replacement activities. [3.48]

**Structural Integrity Program** - periodic measurements (examinations, tests, observations) and analyses performed on structures, systems, and components to detect degradation and/or

analyze its effect(s) on facility performance, safety, or reliability. [3.48]

**Structural Margins** - a measure of a component or its support to perform its design function safely, considering material properties, installed loadings, and operating and environmental conditions. [3.48]

**Structure, System, or Component (SSC)** - structures, systems (hardware and software), or components that have a boundary and are replaceable. SSCs are either configuration controlled or non-configuration controlled. [1.05]

**Supplemental Requirements** – additional supplier requirements or provisions (over and above normal for functional, technical and procurement quality requirements) for an SSC derived through evaluation of potential risk factors associated with the procurement and usage of the SSC. [3.10]

**Supplier** - any individual or organization who furnishes items or services in accordance with a procurement document. All-inclusive term used in place of the following: vendor, seller, contractor, subcontractor, dealer, fabricator, consultant, manufacturer, distributor, and their subtier levels. [1.20]

**Support Document** - document types, in addition to Essential, that provide engineering, maintenance and operations the details necessary for plant operations. Support document types typically include facility and system design descriptions, MEL, and drawings as defined in Procedure Manual E7, Procedure 1.05. [1.05]

**Sustainable Design (SD)** – the use of multiple design concepts, including Pollution Prevention (P2), Energy Efficiency (E2), and Affirmative Procurement (AP), to consider the impact(s) of an activity, project, or product's life cycle on the sustainable use of environmental and energy sources. [1.41]

**System** - a collection of independent components integrated to perform a specific function or functions. [1.30]

**System Design Description (SDD)** - the facility system technical document that defines the functions, performance, design, physical, testing, interface, operating, and maintenance requirements for a

system and the associated components. The SDD provides the single source for communicating and controlling the system and component level requirements. [2.12]

**System Software** - software designed to enable the operation and maintenance of a computer system and its associated computer programs (e.g., Windows NT, VMS and Unix.) [5.03]

**Systems Engineering Management Plan** - a control tool, internal to and maintained by the Project Team, which details the strategy for implementation of a disciplined systems engineering process. [2.04]

**Systems Engineering Process** – a structured approach that clearly defines the mission or problem, manages system functions and requirements, identifies and manages risk, establishes bases to conduct informed decision making, and verifies that products and services meet customer needs. [2.04]

**Task (T) Drawing** - a drawing that is controlled entirely by the technical agency for use in the design, procurement, construction, fabrication, installation or testing of Infrastructure and Industrial Modifications. [1.53]

**Task Requirements and Criteria Document (TR&C)** - a design input document used to identify the purpose and need for a plant modification, to provide a general description of the objective(s) of the modification, to describe functional requirements with associated bases, to identify the alternatives evaluated and to establish the applicable design criteria at the appropriate level of detail necessary to proceed with the design of a plant modification. [2.13]

**Task Sponsor** - the custodian of the facility to be modified. [2.05]

**Technical Agency** - an organization designated by the Modification Manager to perform activities required for a software modification or to develop technical baseline documents in support of a plant modification. The Design Authority or Design Agency may serve as the Technical Agency for one or more of the modification activities. [2.05]

**Technical Assistance Request** - a document that requests technical work or information from a Technical Agency when the assistance is

not expected to impact a technical baseline. [3.12]

**Technical Baseline** - all documents, including all safety documentation, used to identify, justify and demonstrate the physical, functional or operational requirements of configuration controlled structures, systems and components. [1.10]

**Technical Baseline List (TBL)** - a document that identifies the technical baseline documents for a facility grouped by system. [1.05]

**Technical Baseline Modification** - the development of a technical baseline for a new configuration controlled SSC or a change to the data in the technical baseline of an existing configuration controlled SSC. [1.05]

**Technical Baseline Task** - the technical work required to generate and document any of the activities of the technical baseline modification process. [2.02]

**Technical Errors** – mistakes or use of data that cause incorrect results

**Technical Evaluation** - an evaluation performed to assure that the correct technical requirements for an item are specified in the commercial grade documentation . [3.46]

**Technical Report** - a report or compilation of documentation that presents scientific facts or the results of technical work conducted by a Technical Agency in support of an operating or proposed facility. Technical reports in the context of this procedure include any documentation that supports decisions relating to the establishment or modification of a technical baseline. [3.60]

**Technical Risk** - any technical factor, element, constraint, or course of action that introduces as uncertainty of outcome or the possibility of deficiencies, inadequate performance, schedule delays or cost overruns. [2.05]

**Technical Risk Analysis** - an identification and evaluation process to determine if technical risks exist or would be created during the execution of a plant modification.[2.05]

**Technical Safety Basis Document**– a technical safety evaluation

document consistent with the commensurate associated hazard (e.g., Safety Analysis Report for Packaging, Onsite Safety Assessment, Type A package approval documentation, Industrial package documentation, or Strong-Tight container documentation) [3.15]

**Technical Task Request (TTR)** - a documented request for technical services or information related to the validity of, or changes to, a technical baseline that usually requires support from Projects Engineering and Construction Division (PE&CD) or Savannah River Technology Center (SRTC). [2.02]

**Technology Assessment** - an evaluation of the ability of existing technology to implement a proposed plant modification. [2.07]

**Technology Development** - the development of new or unproven technologies; the application of existing technologies to new/different uses; or the combining of existing or proven technologies to achieve a specific goal. [2.07]

**Technology Development Program Plan** – a comprehensive planning document describing technology development activities required for the successful execution of an identified modification and their relationship to the overall modification scope and schedule. This may be referred to as a Technology or Research & Development (R&D) Roadmap. [2.07]

**Technology Review** – an independent assessment of the Technology Development activities for technical maturity and readiness to proceed to the next design phase of a proposed plant modification with acceptable risk. [2.61]

**Technology Review Committee** - the selected group of individuals that shall review and comment on the Data Package submitted for Technology Review. [2.61]

**Technology Review Data Package (Data Package)** - Technology Review information that includes the approved task input documents and task output documents and any supporting laboratory or pilot-facility analytical and test results for a plant modification under review. [2.61]

**Technology Review Report** - documentation prepared by the Technology Review Committee Chairperson presenting results from

the Technology Review. Contains specific recommendations for path forward. [2.61]

**Temporary Modification** - modifications made to configuration controlled structures, systems, or components when the changes are not intended to be permanent and associated changes to the affected controlled documents are not incorporated. These modifications are temporary in that they are intended to be installed for six months or less, except for those required to establish an interface between an operating system and one in lay-up or otherwise support a lay-up. [2.06]

**Test Acceptance Criteria (TAC)** - a "critical" pre-defined qualitative or quantitative measurement that requires testing to satisfy a performance requirement(s). A "critical" measurement is one that is specified in the Safety Basis, involved in the protection of SS/SC systems, or specified in operating/licensing permits. [2.26]

**Tie-In** – connection of new or modified equipment to existing facilities. [3.80]

**Total Effective Dose Equivalent (TEDE)** – the sum of the deep dose equivalent (for external exposures) and the committed effective dose equivalent (for internal exposure). [2.25]

**Trend Analysis** - a systematic evaluation of monitored parameters to identify and predict changes in the performance of a system or component. [3.04]

**Type 1 Calculation/Commercial Calculation** - an engineering calculation that is intended to be issued and controlled as an independent document (i.e. a stand-alone document). A type 1 calculation is statused as one of the following: [2.31 & 1.54]

- Preliminary Calculation – calculations made for estimates of performance, costs or scale which are not performed with the intent of being directly incorporated in final design documents. They may include calculations to be incorporated in cost studies, or bid specifications, or as estimates in reports to regulatory agencies.

Preliminary calculations may form the basis for preliminary safety analysis or preliminary design work, or for issue of drawings or specifications for construction or procurement when only preliminary

data is available (e.g., data supplied on similar equipment manufactured for other modifications, designer's or supplier's knowledge of similar systems, etc). Such calculations will be revised to assume the status of confirmed calculations when confirmed data is available. Design and analysis work performed based on preliminary calculations shall be reviewed and revised as necessary if the results of confirmed calculations differ from the preliminary results.

- Confirmed Calculation – calculations that form the basis for preliminary safety analysis, drawings, specifications, or other design or safety analysis documents that are used to construct or operate the facility, or provide the design basis DSA for an operating facility, or for modifications to an operating facility. These calculations may be revised due to changes in design criteria, methods or other reasons. [2.31]
- Open Item – input that is not fully confirmed, or ongoing work related to the calculation, that is judged to:
  1. be essential to the conclusions of the calculations and,
  2. involve a high degree or amount of uncertainty such that eventual confirmation of the input or successful completion of the ongoing work is in doubt.

**Type 2 Calculation** - an engineering calculation intended for incorporation in, and to be approved as part of, other documentation (i.e. not meant to be stand-alone). [2.31]

**Type 2 Commercial Calculation** - a commercial engineering calculation intended for incorporation in, and to be approved as part of, other documentation such as Field Change Requests and Non-Conformance Reports. (i.e., not meant to be stand-alone). [1.54]

**Type 2 Independent Review (IR-2)** – An independent review conducted by an individual subject to a different technical direction (i.e., not assigned to the same project or task). [5.03]

**Type B Quantity** – a quantity of radioactive material, for which the aggregate radioactivity exceeds A1 for special form or A2 for normal form. A1 and A2 values are given in Table A-1 at the end of 10 CFR 71 [4.05]

**USQ Qualified Individual** - an individual who has completed site-



level training in the USQ program and facility-based training in the facility AB and has been designated by the Facility Manager as either a Screening Originator, Screening Reviewer, Evaluation Originator or Qualified Reviewer in accordance with Manual 11Q, Procedure 1.05. Such persons are authorized to determine if a modification will impact a DSA or other Safety Basis document per 11Q, 1.05. [2.05]

**Uniquely Tracked Commodity (UTC)** – A specific serialized physical item that is placed at a logical location (e.g., equipment or component) in a facility. [1.31]

**Unit** – a site area classifier or an expression used to differentiate two or more items or functional operations that perform identical or similar functions. [1.30]

**Unlikely** – frequency which is greater than or equal to  $10^{-4}$  per year and less than  $10^{-2}$  per year. [2.25]

**Unmitigated** - taking no credit for either preventors or mitigators. [2.25]

**Validation** – see WSRC Manual 1Q Glossary.

**Value System** - a set of specified criteria used to select the preferred alternative that exhibits the best level of performance to meet the functions and requirements consistent with any cost or schedule considerations. [2.15]

**Vendor Technical Manual (VTM)** – a document that contains one or more vendor supplied technical documents for a specific group of components, as assembly, or a system. The terms Vendor Print File (VPF) or Blueprint File (BPF) may also be used. [2.30]

**Verification** – see WSRC Manual 1Q Glossary.

**Verification Method** – Methods used to verify technical and quality requirements and critical characteristics. Four methods may be used, either individually or in combination. They are:

- Method 1 – Special Tests and Inspections
- Method 2 – Commercial Grade Survey of Supplier

- Method 3 – Source Verification
- Method 4 – Acceptable Supplier/Item Performance Record [3.46]

**Walkdown** - a visual inspection of facility SSCs to identify the as-found physical configuration and any discrepancies with currently approved facility documentation. [1.05]

**Witness Point** - an inspection activity beyond which work shall not proceed until an inspector is notified and (1) the inspection is performed and released, or (2) the inspection is deferred and can be completed at a later time, or (3) the witnessing of the work activity by the inspector is waived by Engineering. [2.36]

**Work Authorization** - approval to process work control documents and proceed with physical modification prior to DCF approval. [2.37]

**Work Package** - A collection of documents used to authorize work, provide instructions for the work, and document accomplishment of the work. [3.46]

**Worker** - population within the site boundary. [2.25]

Unless otherwise noted, the Conduct of Engineering web page and subsequent pages do not contain Sensitive Unclassified Information (SUI).